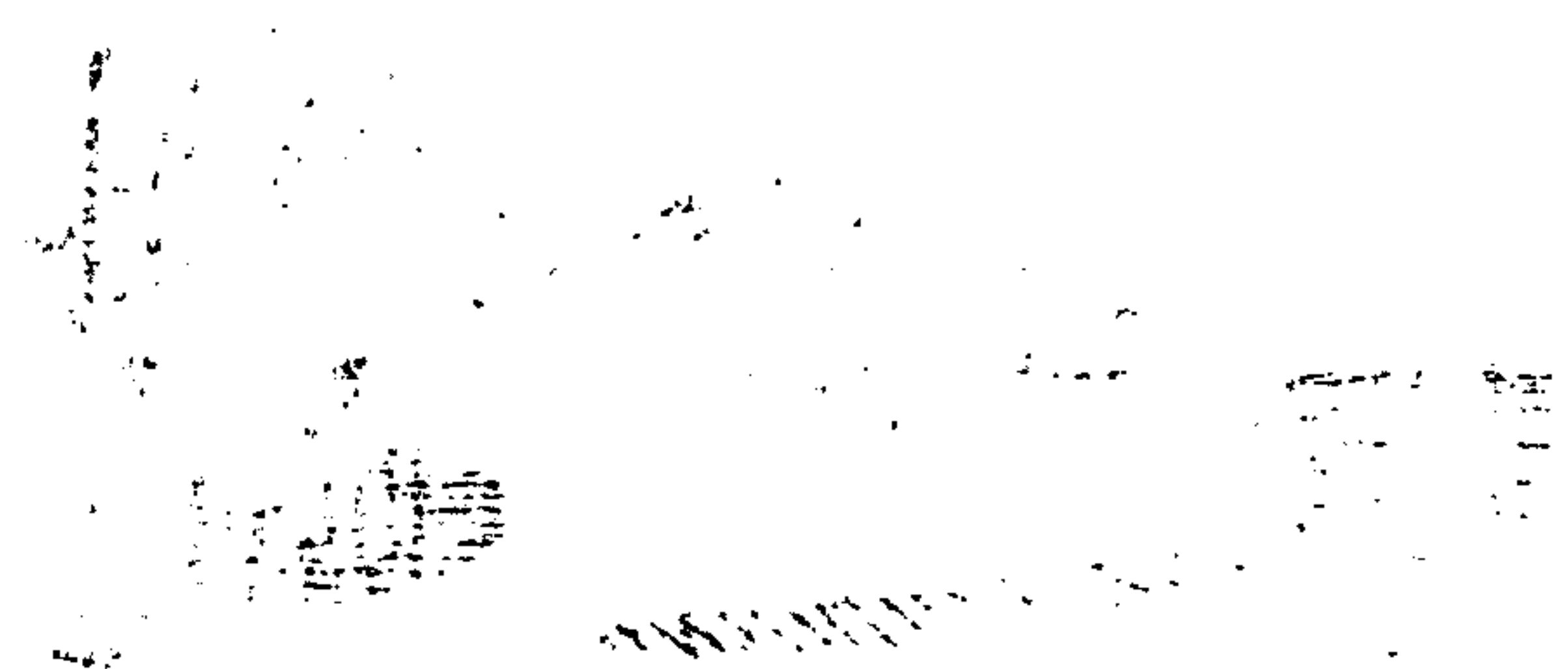
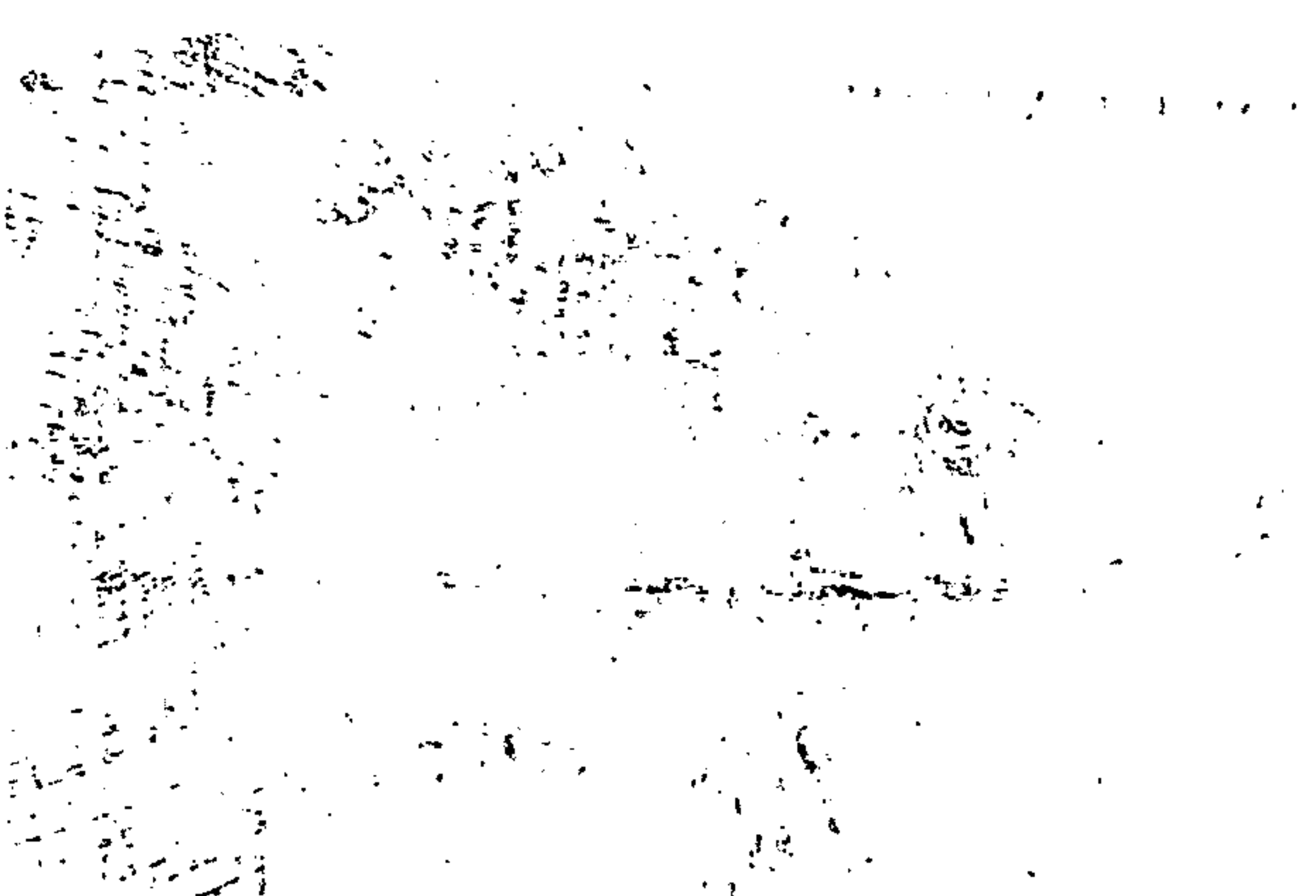
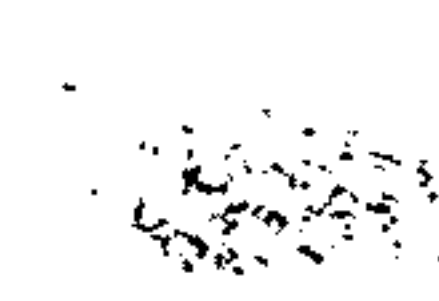


1870

1871



1872

1873

1874

1875



FISHES.

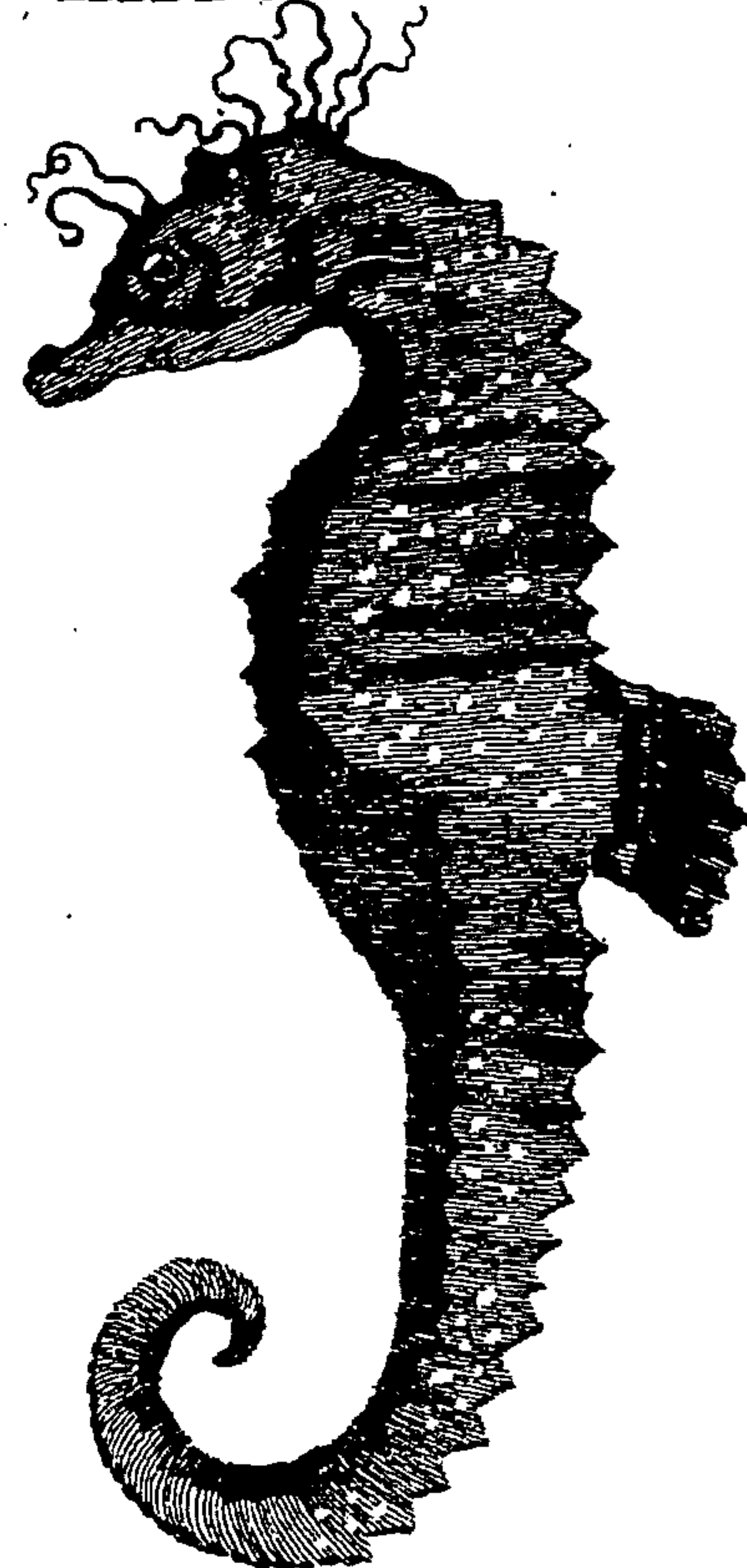
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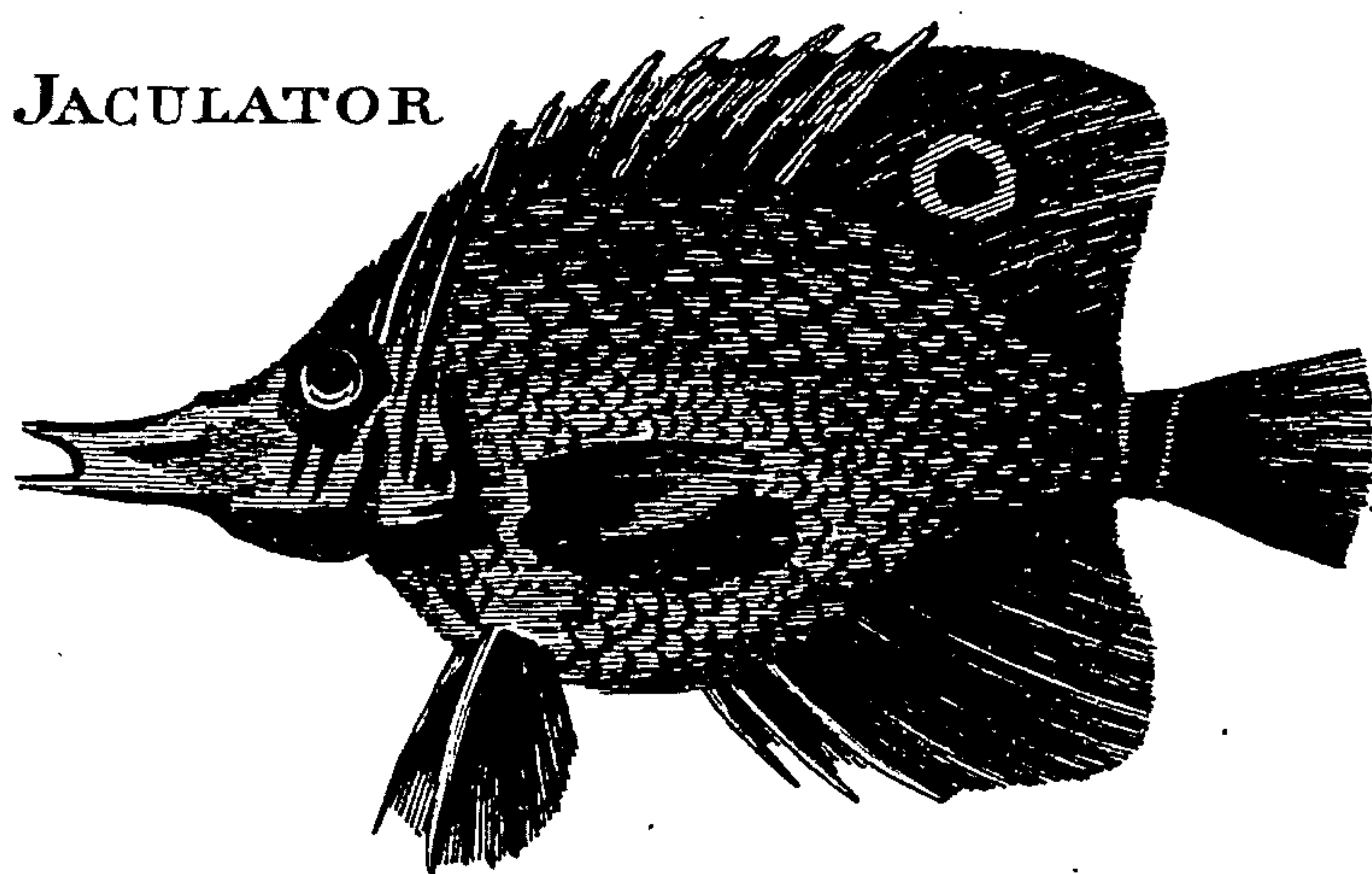
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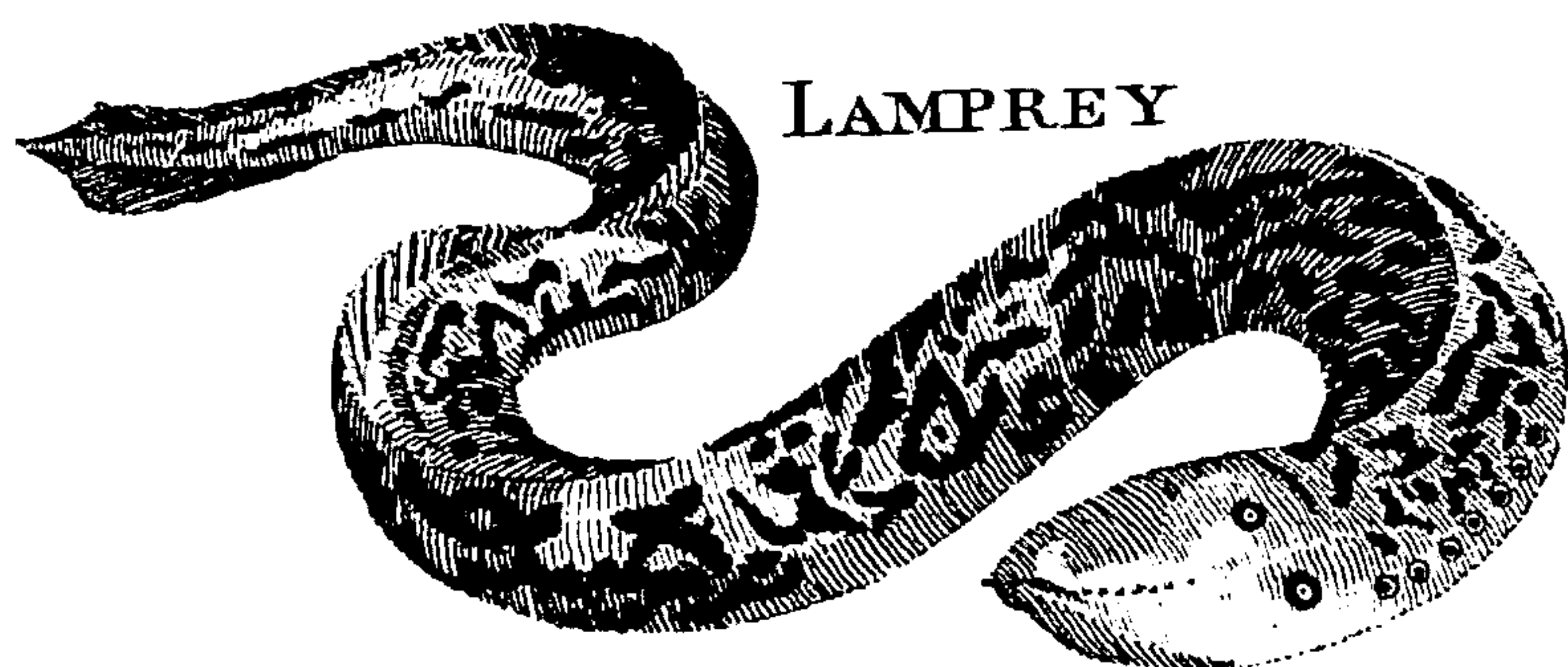
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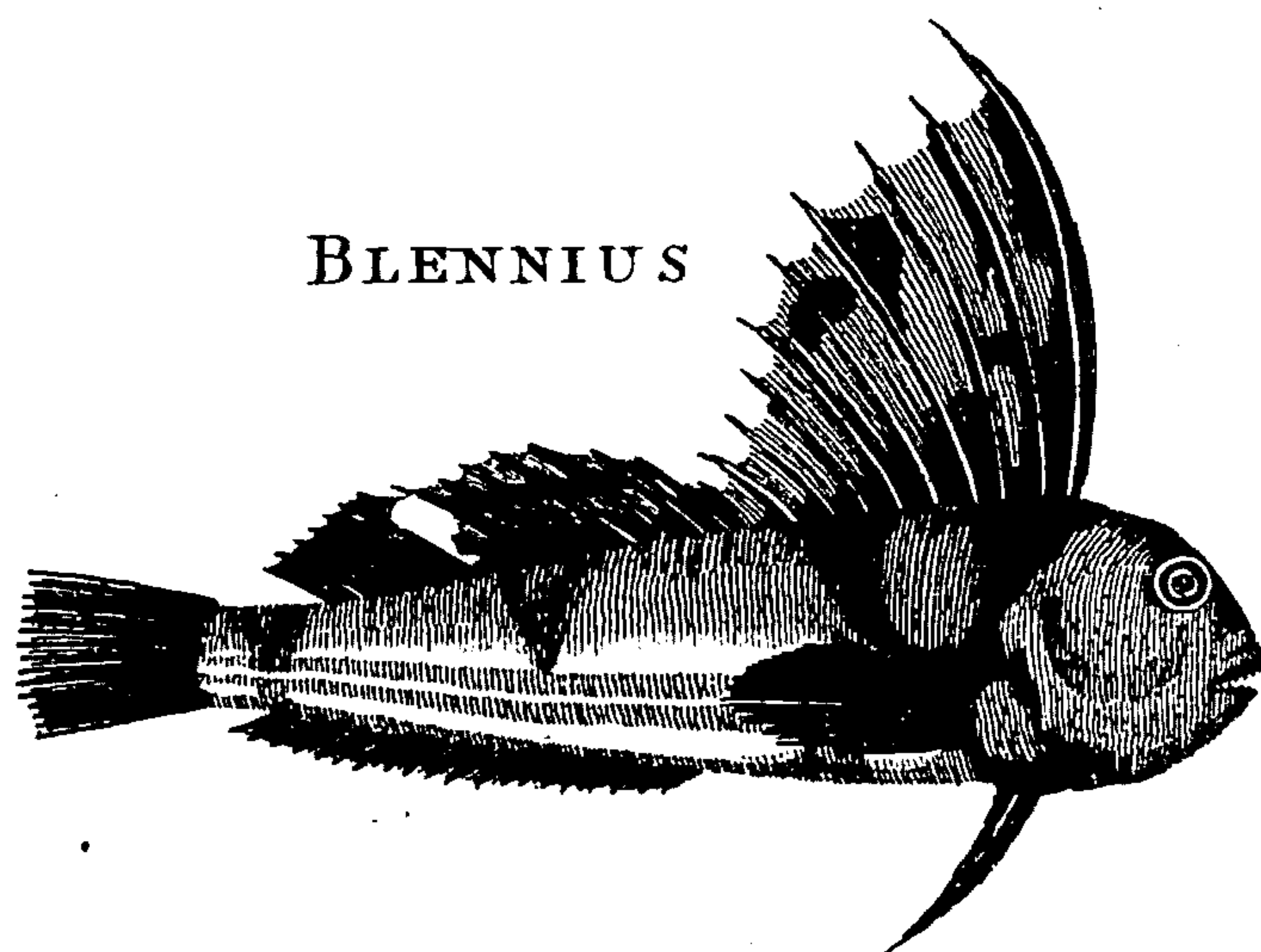
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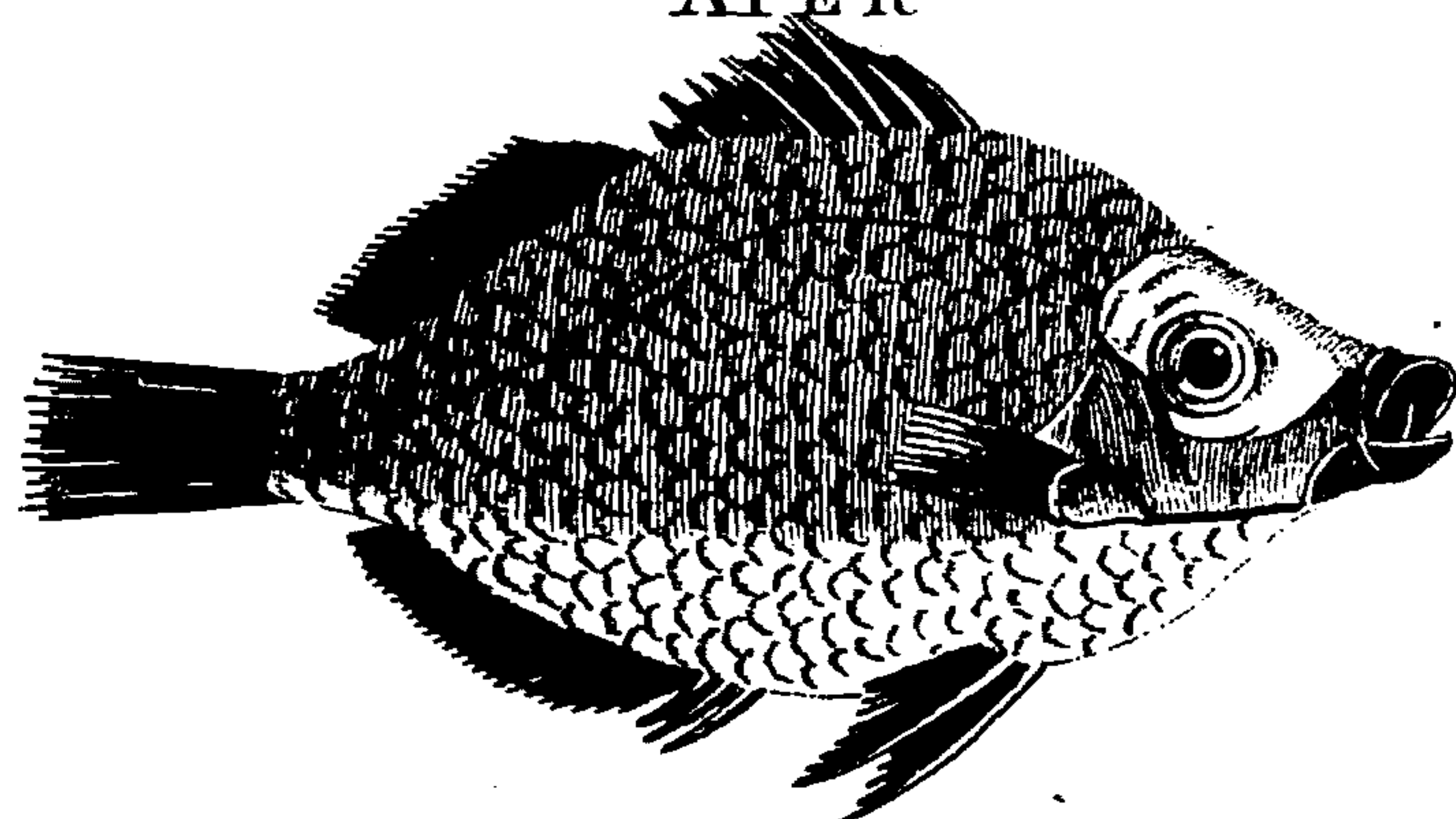
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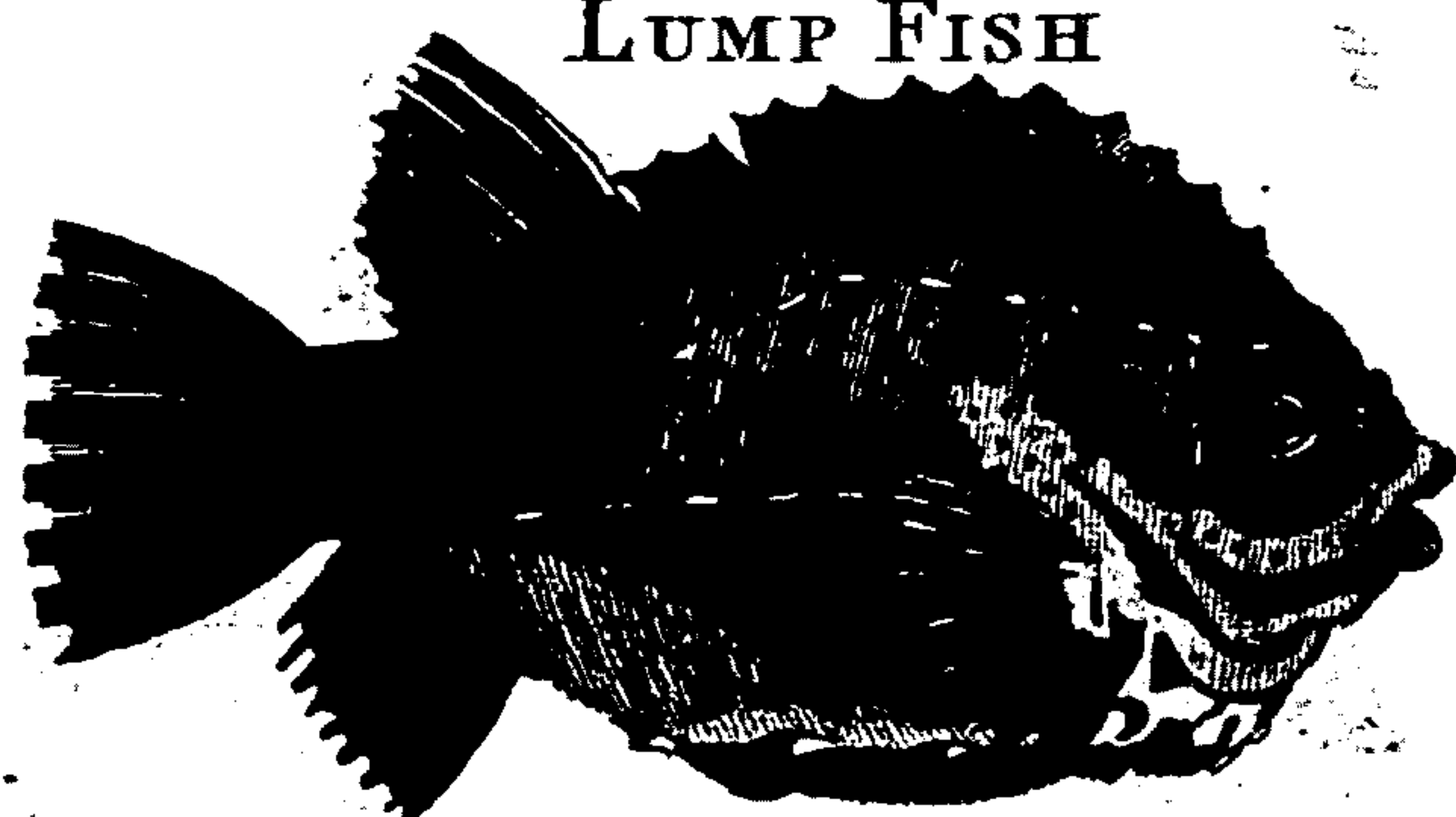
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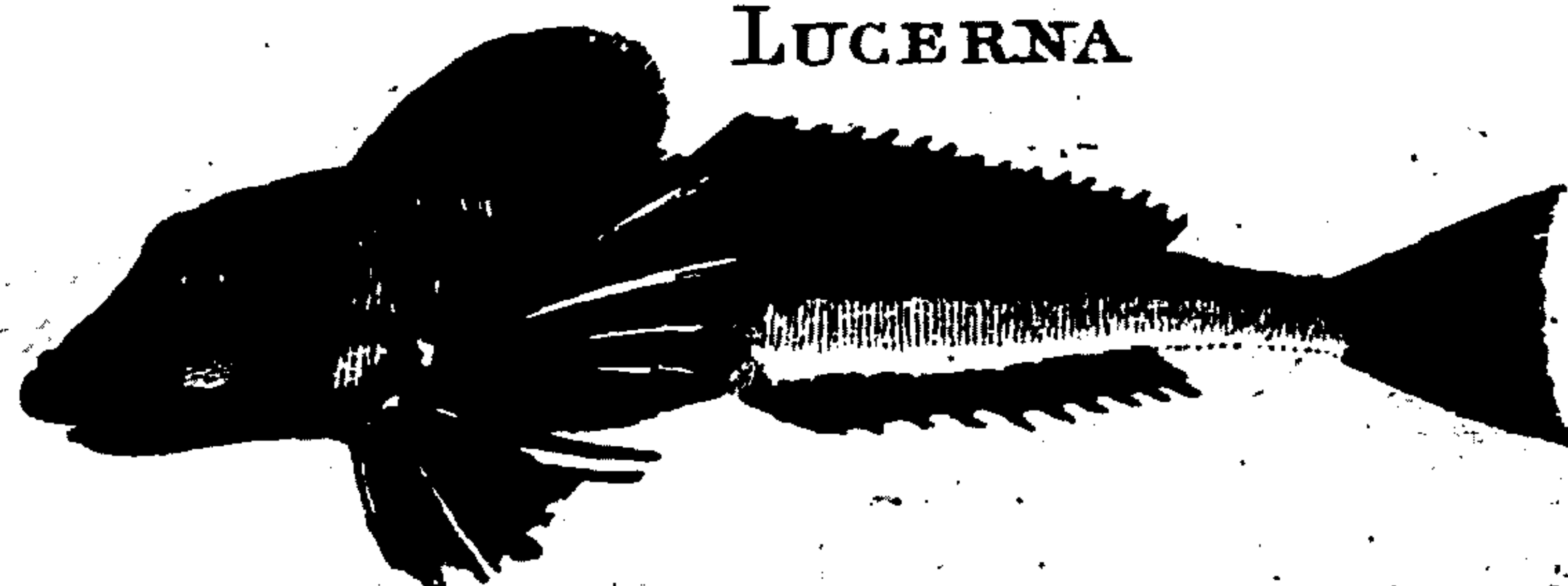
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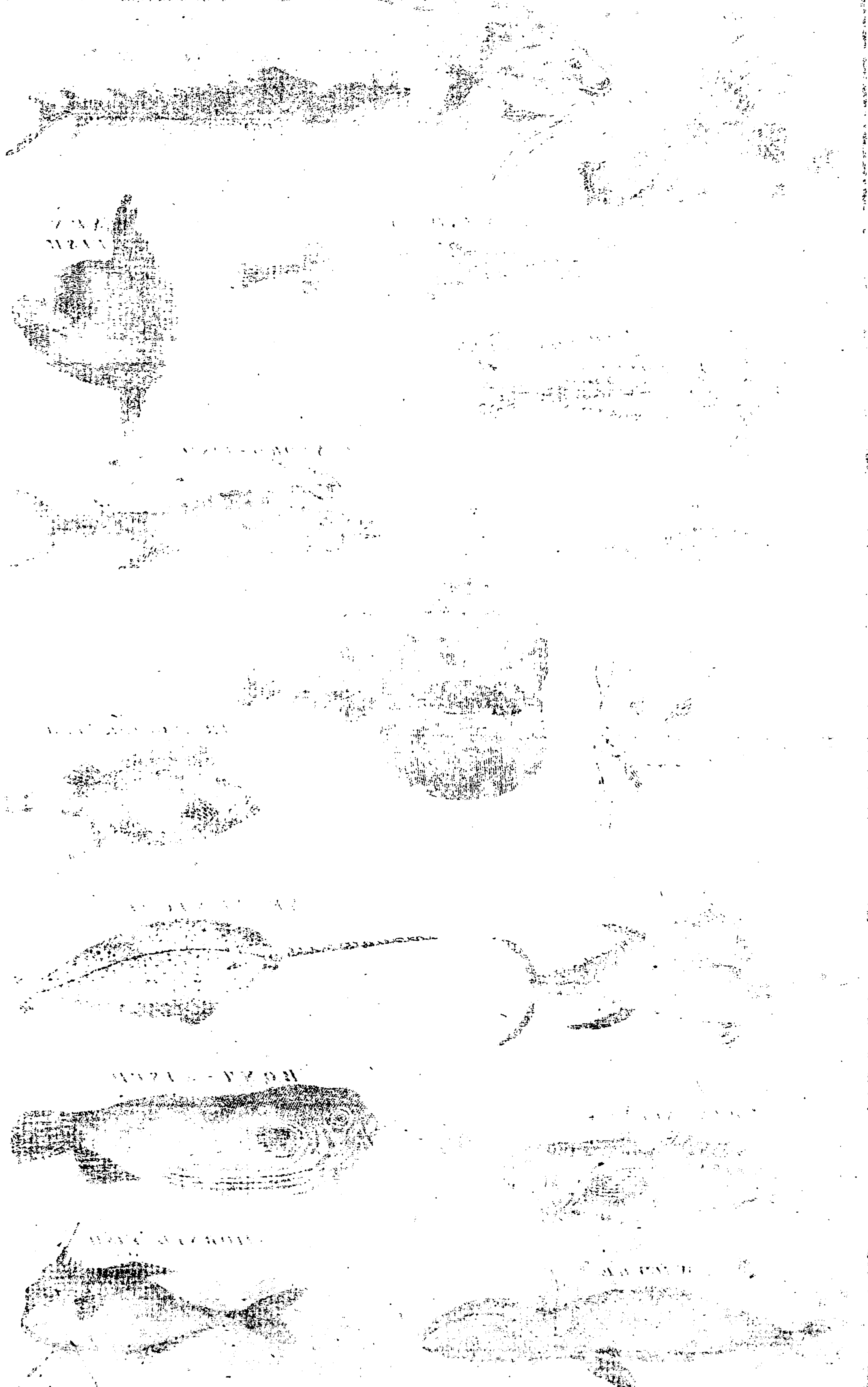


LUMP FISH



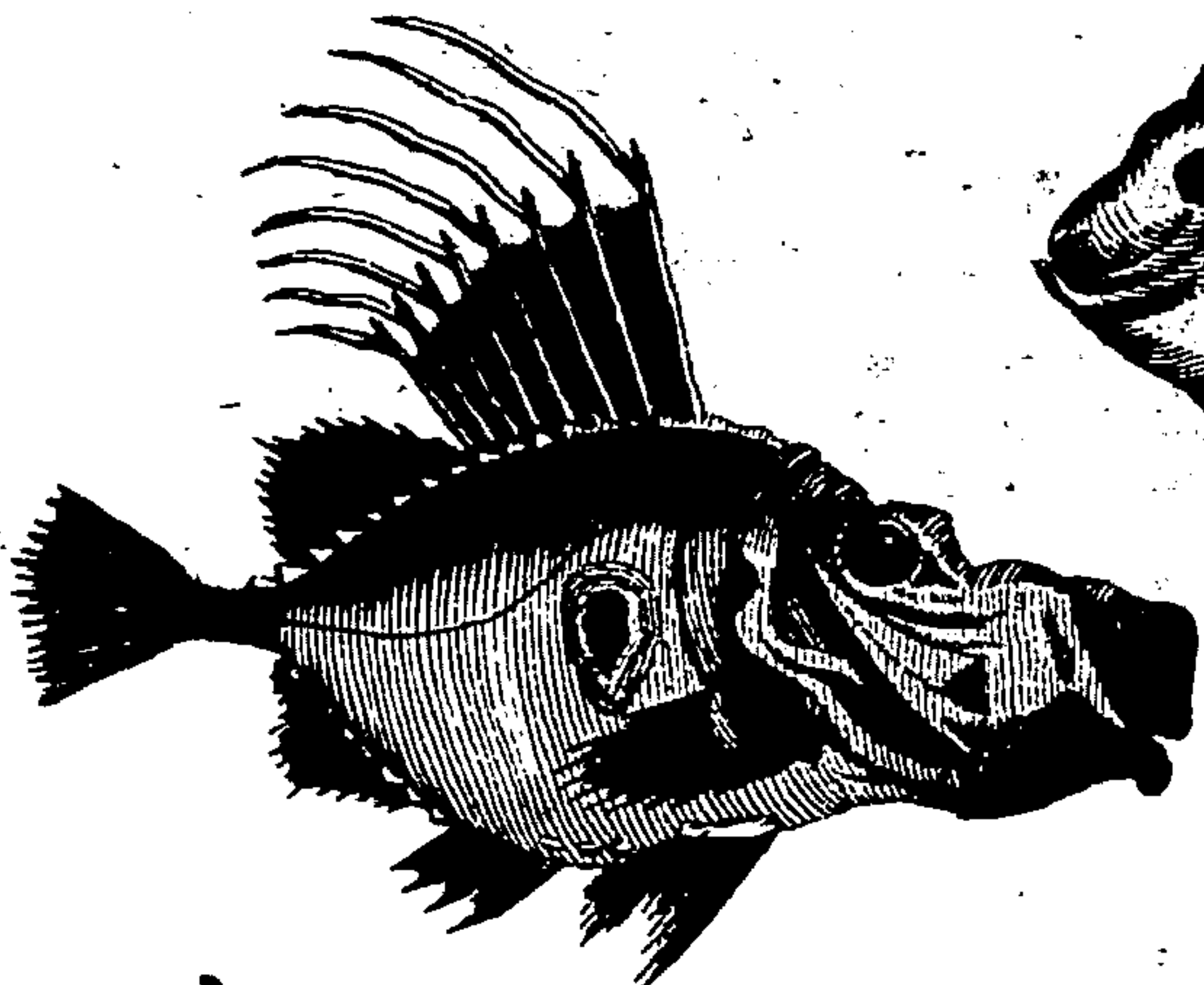
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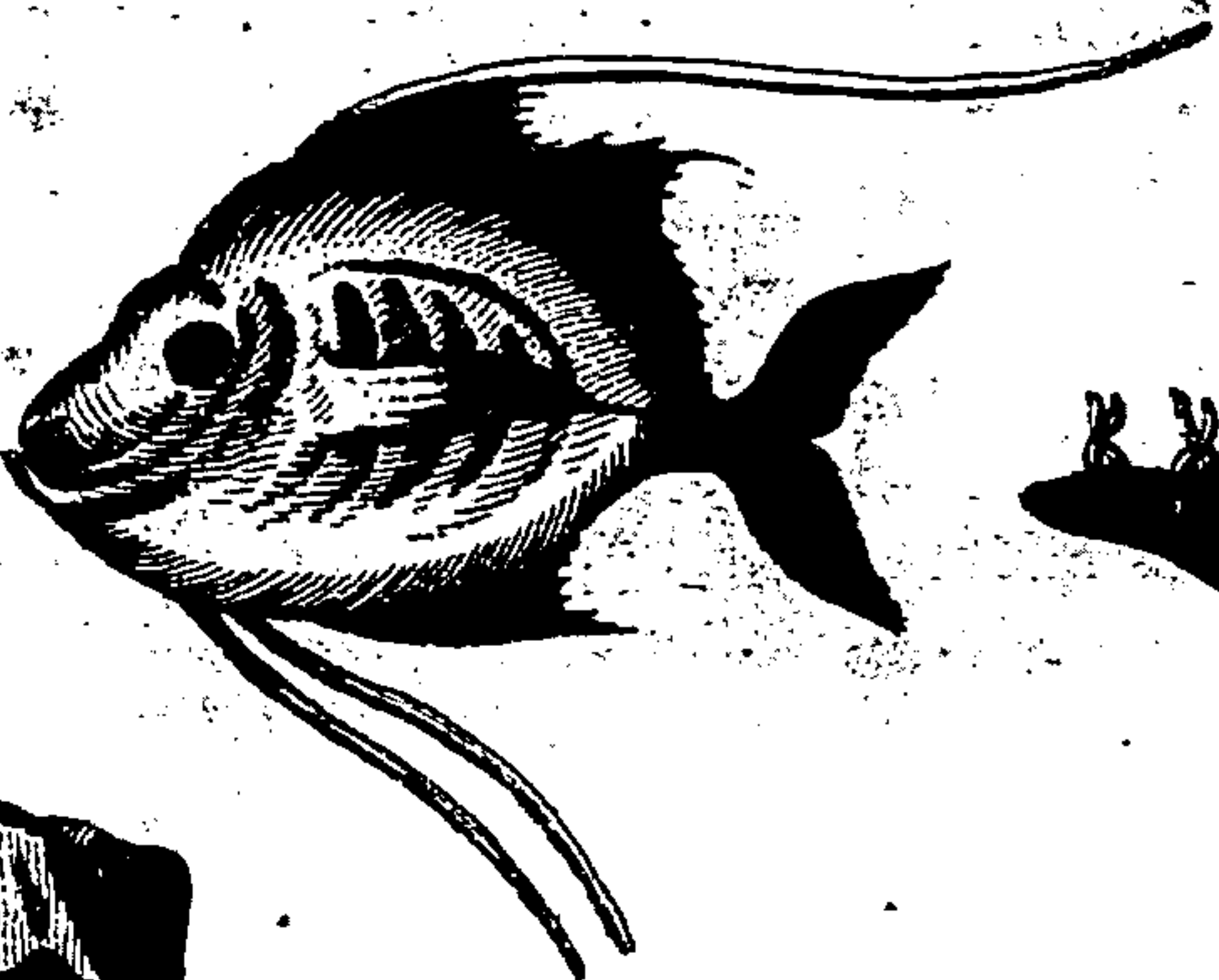


FISHES

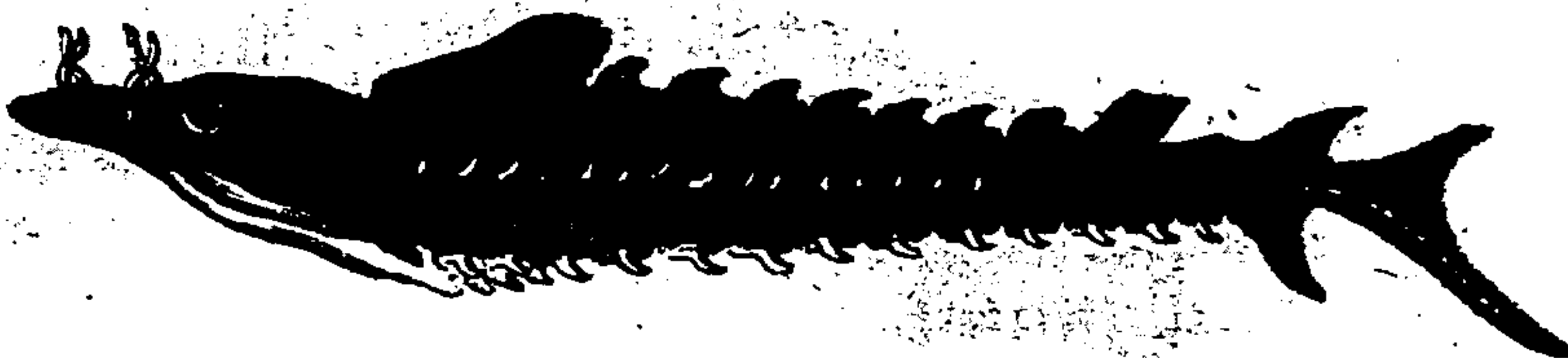
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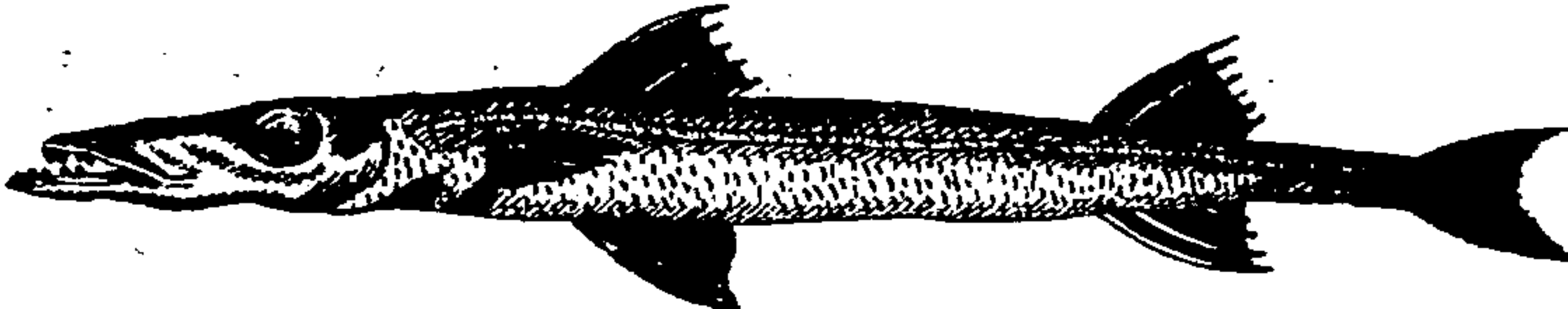
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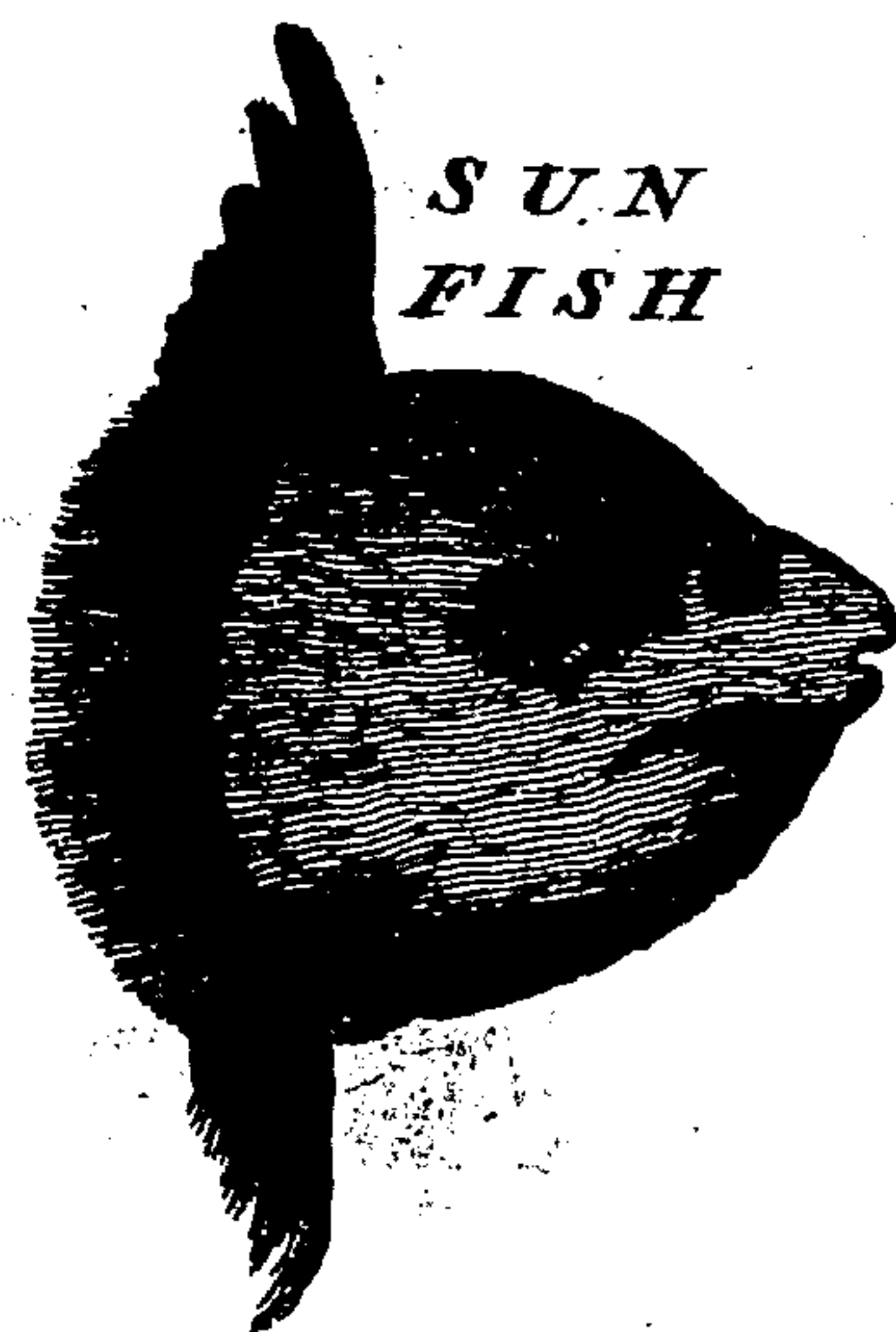
A. STURGEON



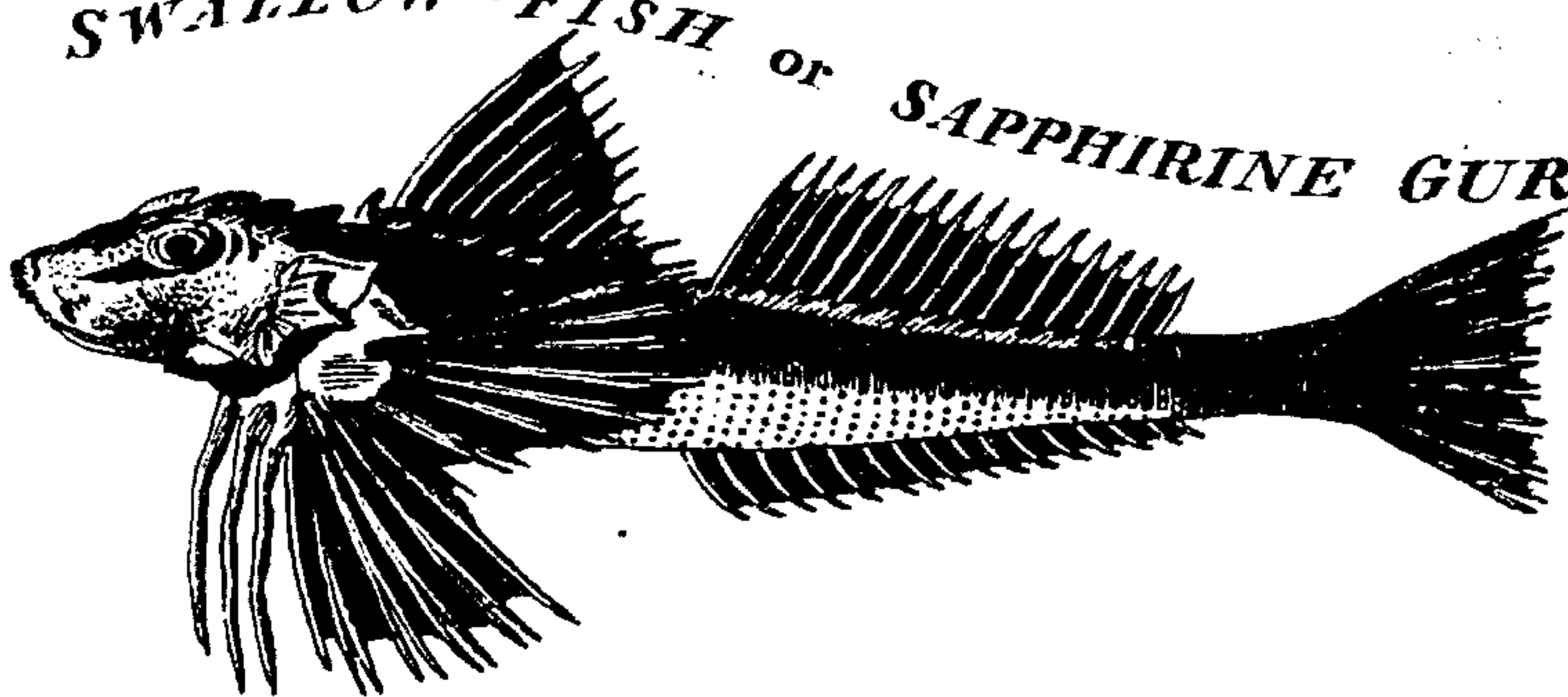
SUDIS



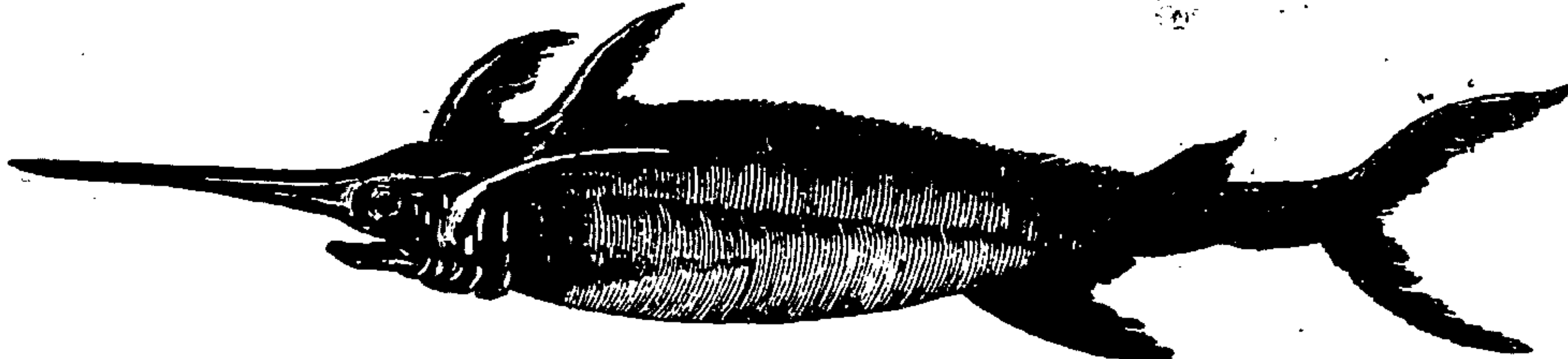
SUN FISH



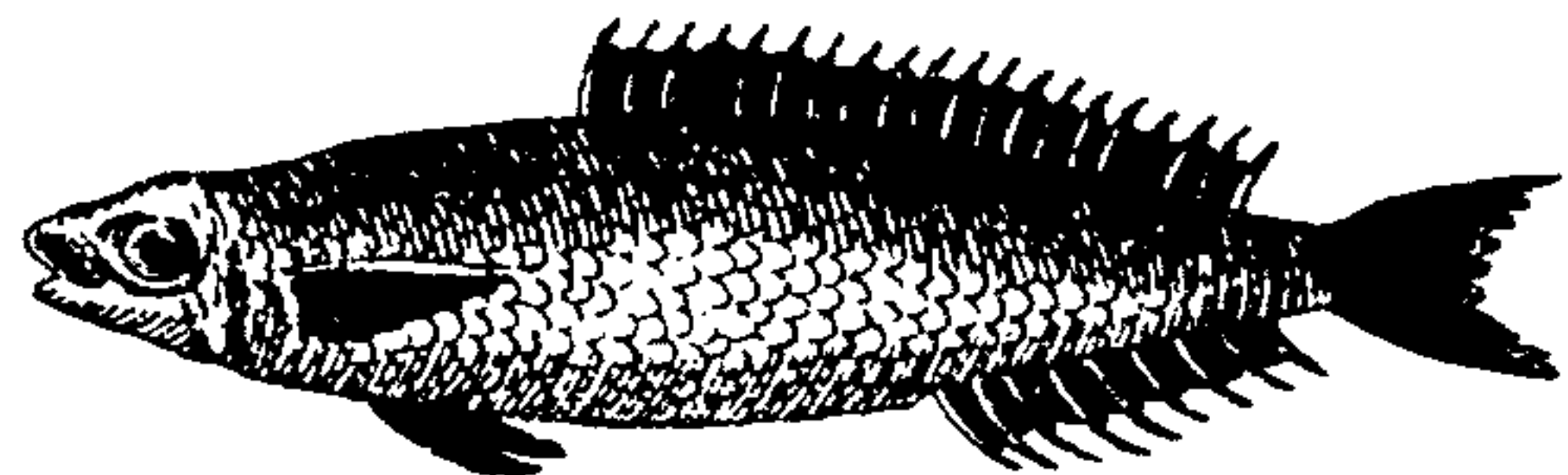
SWALLOW-FISH or SAPPHIRINE GURNARD



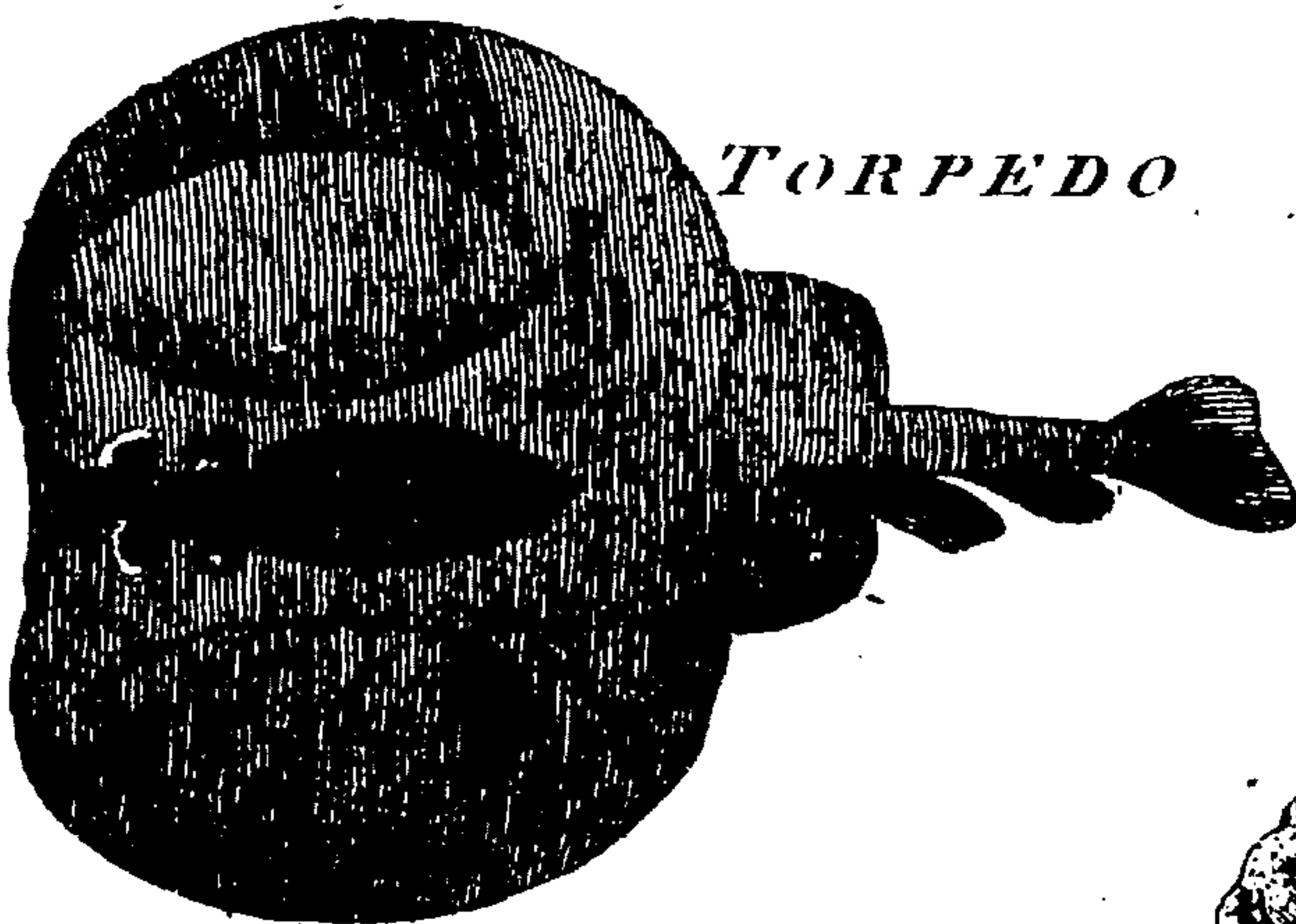
A. SWORD-FISH



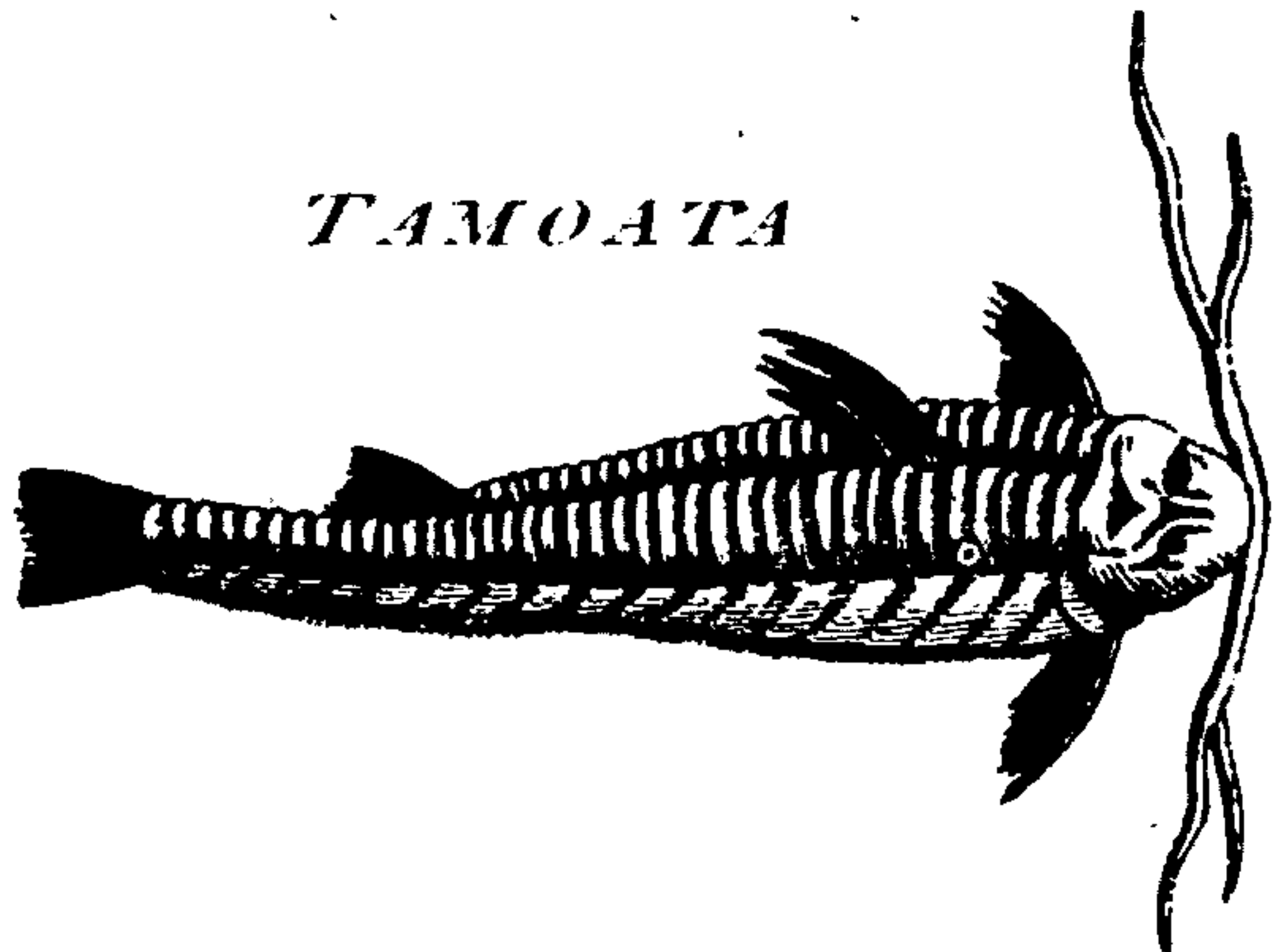
BOOPS



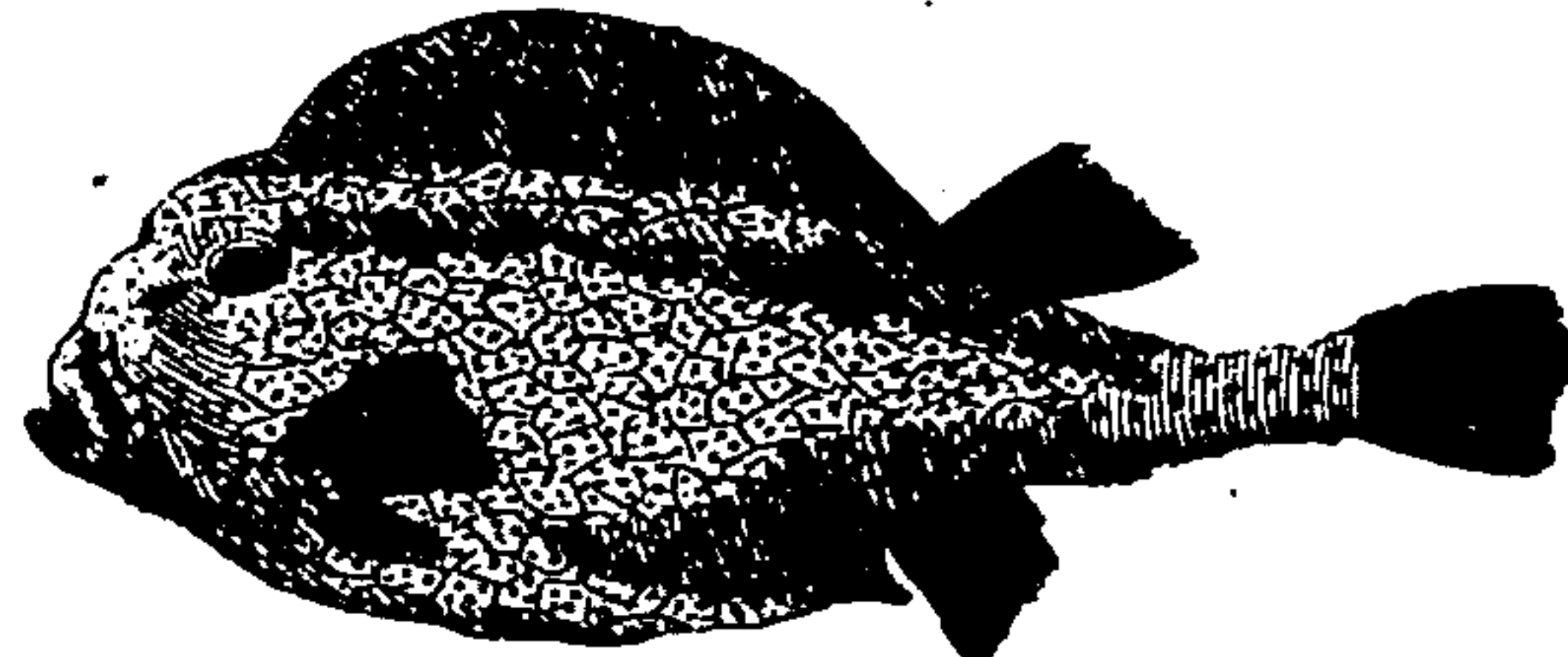
TORPEDO



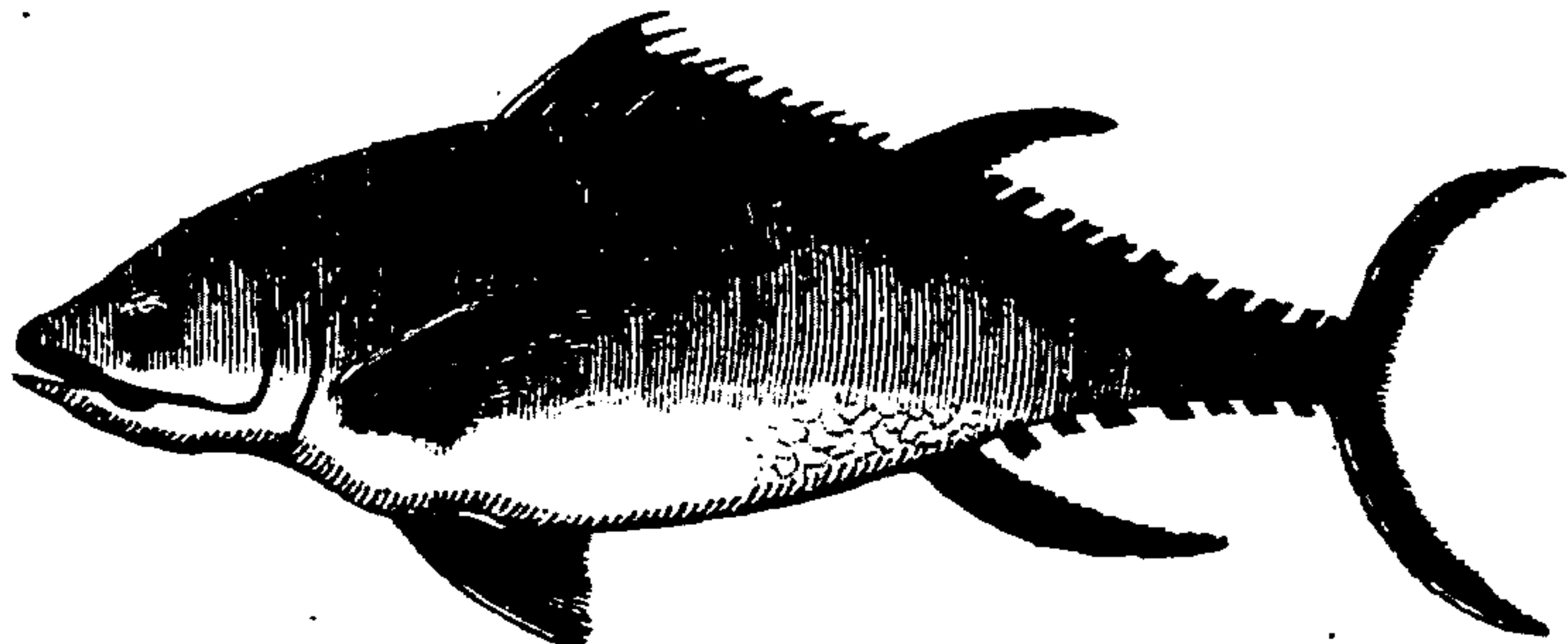
TAMOATA



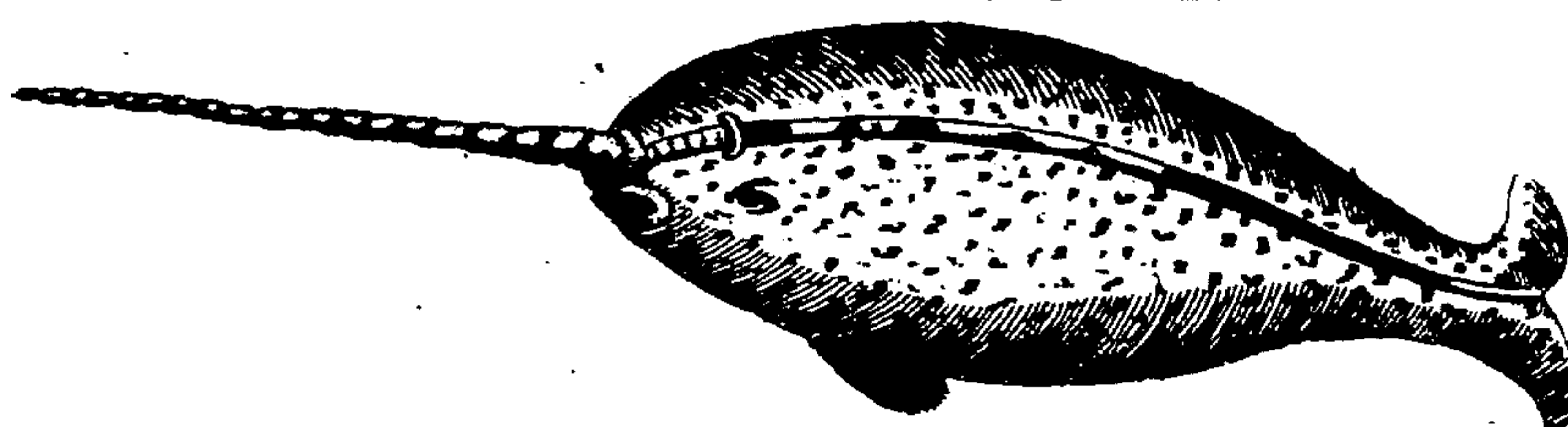
TRIANGULAR-FISH



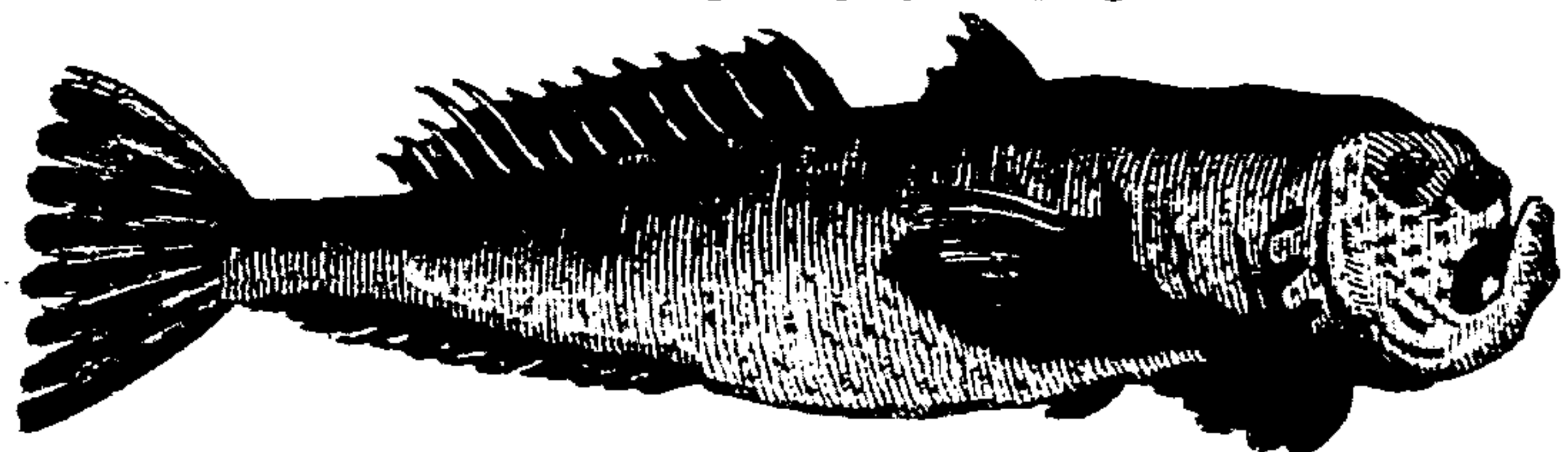
TUNNY



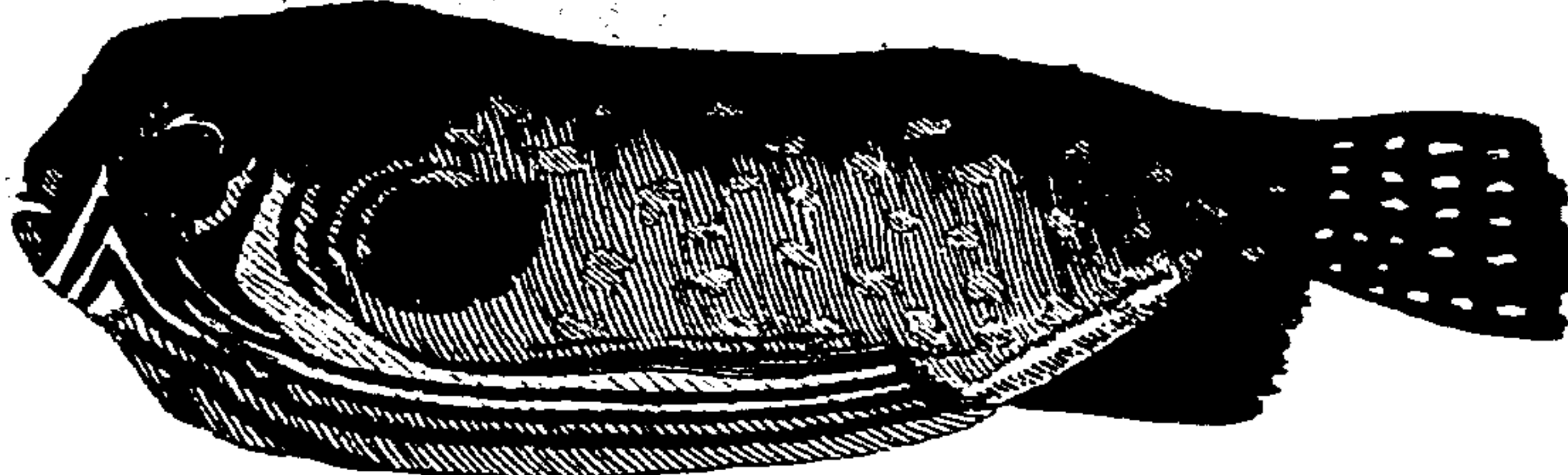
SEA UNICORN



URANOSCOPUS



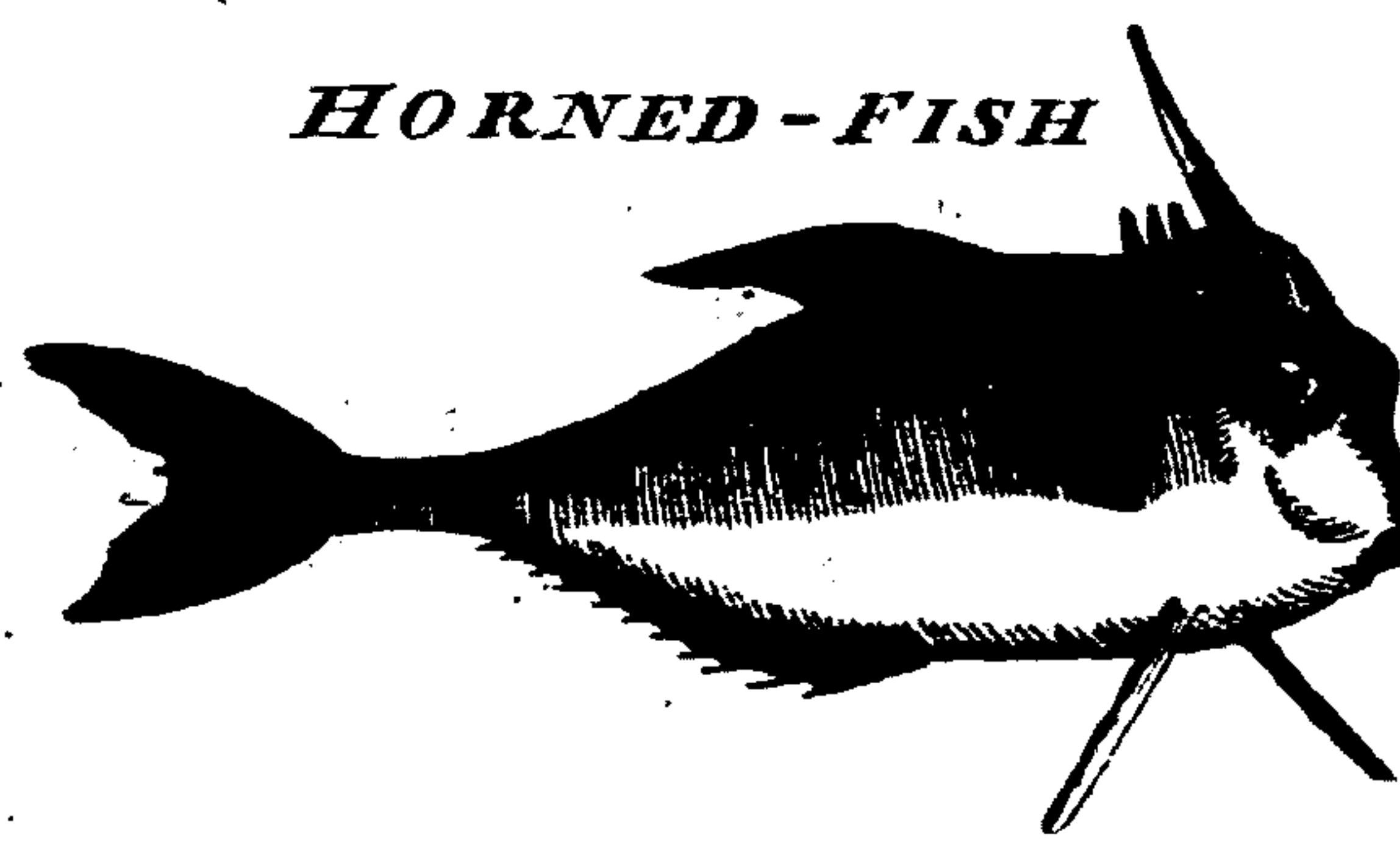
BONT-VISCH



WHALE



HORNED-FISH



or even with a stick, it instantly benumbs the hand and arm to the very shoulder.

Captain Johnson being at Cassan, a sailor caught one of these fish, which he supposed to be a bream; but the very instant that he touched it, he cried out that he had lost the use of his hand. His companions laughed at him, and one of them immediately trod upon it with his naked foot, when his whole leg became suddenly motionless: the cook was then called, and ordered to take the fish and dress it; but he immediately let it fall, and, in a mournful tone, declared he was seized with the palsy. At length a negro, who was present, said he was acquainted with the fish, and assured them that, after it was dead, it would lose the numbing quality.

The following experiment, made by Mr. Walsh, in presence of the academy at Rochelle, for evincing the circuit of the electric matter which issues from the Torpedo, deserves to be quoted.

"A living Torpedo was laid on a table, upon a wet napkin; round another table stood five persons insulated; and two brass wires, each thirteen feet long, were suspended from the ceiling by silken strings. One of the wires rested by one end on the wet napkin, the other end was immersed in a basin full of water, placed on a second table, on which stood four other basins, likewise full of water. The first person put a finger of one hand into the water in which the wire was immersed, and a finger of the other hand into the second, and so on successively till all the five persons communicated with one another by the water in the basins. In the last basin one end of the second wire was dipped, and with the other end Mr. Walsh touched the back of the Torpedo; when the five persons felt a shock, differing in nothing from that of the Leyden experiment, except being weaker. Mr. Walsh, who was not in the circle of conduction, felt nothing. This was several times successively repeated, even with eight persons; and the experiment being related by M. de Signette, mayor of the city, and one of the secretaries to the academy of sciences of Rochelle, and published by him in the French Gazette, the account becomes the more authenticated."

The discourse ends with the following address to Mr. Walsh, on presenting him with the medal.

"In consequence of the approbation of the choice made by the council, so unfeignedly expressed in the countenance of every gentleman present, it remains, that in the name, and by the authority, of the Royal Society in London, formed for the improvement of natural knowledge, I deliver into your hand this medal, the prize you have so meritoriously obtained; not doubting, Sir, of your grateful acceptance of so honourable and unperishing a memorial of their esteem, and of the sense of their obligations to a person, who in so distinguished a manner has contributed to promote the great ends of their institution. And, in the same respectable name, let me add, that they are so much persuaded of your abilities to assist in their grand work, the *interpretation of nature*, that they earnestly call upon you to continue your liberal and spirited labours. With pleasure they understand that you have already turned your views to the electric gymnotus, that other wonder of the waters, an animal possessed of powers similar to those of the Torpedo, but of superior energy; and the society flatter themselves, that so much light will be gained by that enquiry, that you will be enabled soon to make a farther discovery of the mysteries of nature. Her veil, fear not, Sir, to approach. Animated with the presence of this illustrious and successful body, I will venture to affirm, that nature has no veil, but what time and persevering experiments may remove. In the instance before us, view the progress of the powers of the mind; view the philosophers of the early ages,

like the "children of the world," amused and satisfied with the stories of the Torpedo, as incurious about their authenticity, as about the causes of such extraordinary effects. This animal served them for an emblem, or an hieroglyphic, for a figure of speech, or an allusion of pleasantry: at best as a theme for a copy of verses. But the world, rising in years and in wisdom, rejects such trifles. The interpreters of nature, in the adult state of time, make experiments and inductions, distrust their intellects, confide in facts and in their senses: and by these arts drawing aside the veil of nature, find a mean and groveling animal armed with lightning; that awful and celestial fire revered by the ancients as the peculiar attribute of the father of their gods."

The following is a curious account of the Gymnotus Electricus, or electrical Eel. In a Letter from Alexander Garden, M. D. F. R. S. to John Ellis, Esq; F. R. S. read before the Royal Society the 23d of February, 1775.

*Charles-Town, South-Carolina.
August 14, 1774.*

"Sir,

"A few days since I went to see some very curious fish, which were brought here about nine or ten weeks ago from Surinam; and I was both surprized and delighted to observe their strange shape, and experience their wonderful properties. I had before received some vague account of such a fish; but I always thought, that much of what I always heard was fabulous. There are five of these fishes now here, of different sizes, from two feet in length, to three feet eight inches. The following description was made out from the longest and largest. It might have been much more accurate, if there had been a possibility of handling the fish, and examining it leisurely; or if I could have had a dead specimen, as many things relating to the internal and external structure could in that case have been more exactly ascertained. But this fish hath the amazing power of giving so sudden and so violent a shock to any person that touches it, that there is, I think, an absolute impossibility of ever examining, accurately, a living specimen, and the person who owns them, rates them at too high a price (not less than fifty guineas for the smallest) for me to get a dead specimen, unless one should die by accident; if that should happen, you may depend on having a more exact and accurate account for the Society.

"George Baker, mariner, who brought them here, intends to carry them to England; but as it is very uncertain whether they will arrive in health, and all alive, I have recommended to him to get a small cask of rum, with a large bung, into which he may put any of them that may die, and so prepare them for the inspection and examination of the curious when he arrives.

"The largest of these fish was three feet eight inches in length, when extending itself most, and might have been from ten to fourteen inches in circumference about the thickest part of the body. The head is large, broad, flat, smooth, and impressed here and there with holes, as if perforated with a blunt needle, especially towards the sides, where they are more regularly ranged in a line on each side. The rostrum is obtuse and rounded. The upper and lower jaws are of an equal length, and the gape is large. The nostrils are two on each side; the first large, tubular, and elevated above the surface: and the others small, and level with the skin, placed immediately behind the verge of the rostrum, at the distance of an inch asunder. The eyes are small, flattish, and of a bluish colour, placed about three quarters of an inch behind the nostrils, and towards the sides of the head. The whole

whole head seems to be well supported; but whether with bones or cartilages, I could not learn. The body is large, thick, and roundish, for a considerable distance from the head, and then gradually grows smaller, but at the same time deeper, or becomes of an acinaci-form shape to the point of the tail, which is rather blunt. There are many light coloured spots on the back and sides of the belly, placed at considerable distances in irregular lines, but more numerous and distinct towards the tail. When the fish was swimming, it measured sixteen inches in depth near the middle, from the upper part of the back to the lower edge of the fin, and it could not be more than two inches broad on the back at that place. The whole body, from about four inches below the head, seems to be clearly distinguished into four different longitudinal parts or divisions. The upper part, or back, is roundish, of a dark colour, and separated from the other parts on each side by the lateral lines, which, taking their rise at the base of the head, just above the pectoral fins, run down the sides, gradually converging as the fish grows smaller, to the tail, and makes so visible a depression or furrow in their course, as to distinguish this from the second part or division, which may be properly called the body, or at least appears to be the strong muscular part of the fish. This second division is of a lighter and more clear bluish colour than the upper or back part, and seems to swell out somewhat on each side, from the depression of the lateral lines; but towards the lower or under part, is again contracted, or sharpened, into the third part, or carina. This carina, or keel, is very distinguishable from the other two divisions by its thinness, its apparent laxness, and by the reticulated skin of a more grey and light colour, with which it is covered. When the animal swims gently in pretty deep water, the rhomboidal reticulations of the skin of this carina are very discernible; but when the water is shallow, or the depth of the carina is contracted, these reticulations appear like many irregular longitudinal plicæ. The carina begins about six or seven inches below the base of the head, and gradually widening or deepening as it goes along, reaches down to the tail, where it is thinnest. It seems to be of a strong muscular nature. Where it first takes its rise from the body of the fish, it seems to be about one inch, or one inch and an half thick, and is gradually sharpened to a thin edge, where the fourth and last part is situated, *viz.* a long, deep, soft, wavy fin, which takes its rise about three or four inches at most below the head, and runs down along the sharp edge of the carina, to the extremity of the tail. Where it first rises, it is not deep, but gradually deepens or widens as it approaches the tail. It is of a very pliable, soft consistence, and seems rather longer than the body. The situation of the anus in this fish is very singular, being placed underneath, and being about an inch more forward than the pectoral fins, and consequently considerably nearer the rostrum. It is a pretty long rima in appearance; but the aperture must be very small, as the formed excrements are only about the size of a quill of a common dunghill fowl. There are two pectoral (if I may call them so) fins, placed one on each side, just behind the head, over the *foramina spiratoria*, which are small, and generally covered with a lax skin, situated in the axillæ of these fins. These fins are small for the size of the fish, being scarcely an inch in length, of a very thin, delicate consistence, and orbicular shape. They seem to be chiefly useful in supporting and raising the head of the fish when he wants to breathe, which he does every four or five minutes, by raising his mouth out of the water: this shews that he has lungs, and is amphibious, and *foramina spiratoria* seem to indicate his having bron-

chiæ likewise; but this I only offer as a conjecture, not being certain of the fact. I must now mention the appearance of a number of small cross bands, annular divisions, or rather *rugæ* of the skin of the body. They reach across the body down to the base of the carina on each side; but those that cross the back seem to terminate at the lateral lines, where new rings take their rise, not exactly in the same line, and run down the carina. This gives the fish somewhat of a worm-like appearance: and indeed it seems to have some of the properties of this tribe, for it has a power of lengthening or shortening its body to a certain degree, for its own convenience, or agreeable to its own inclination. I have seen this specimen, which I have measured three feet eight inches, shorten himself to three feet two inches; but besides this power of lengthening or shortening his body, he can swim forwards or backwards with apparently equal ease to himself; which is another property of the vermicular tribe. When he swims forwards, the undulation, or wavy motion of the fin and carina, begin from the upper part, and move downwards; but when he swims backwards, and the tail goes foremost, and the undulations of the fin begin at the extremity of the tail or fin, and proceed in succession from that backwards to the upper part of the body; in either case he swims equally swift. Every now and then the fish lays himself on one side, as it were, to rest himself, and then the four several divisions of his body above-mentioned are very distinctly seen, *viz.* the vermiform appearance of the two upper divisions; the retiform appearance of the carina; and the last, or dark-coloured fin, whose rays seem to be exceedingly soft and flexible, and entirely at the command of the strong muscular carina. When he is taken out of the water, and laid on his belly, the carina and fin lie to one side, in the same manner as the ventral fin of the *tertraodon* does, when he creeps on the ground. I have been the longer and more particular in the description of the external structure of this animal's body, because I think, as it is of a most singular nature, and endowed with some amazing properties, even the most minute circumstance I was able to observe relating to it, should be mentioned.

"The person to whom these animals belong, calls them *electrical fish*; and indeed the power they have of giving an electrical shock to any person, or to any number of persons who join hands together, the extreme person on each side touching the fish, is their most singular and astonishing property. All the five we have here are possessed of this power in a very great degree, and communicate the shock to one person, or to any number of persons, either by the immediate touch of the fish with the hand, or by the mediation of any metalline rod. The keeper says, that when they were first caught, they could give a much stronger shock by a metalline conductor than they can do at present. The person who is to receive the shock, must take the fish with both hands, at some considerable distance asunder, so as to form the communication, otherwise he will not receive it; at least I never saw any one shocked from taking hold of it with one hand only; though some have assured me, that they were shocked by laying one hand on him. I myself have taken hold of the largest with one hand only, without ever receiving a shock; but I never touched it with both hands, at a little distance asunder, without feeling a smart shock. I have often remarked, that when it is taken hold of with one hand, and the other hand is put into the water over its body, without touching it, the person received a smart shock; and I have observed the same effect follow when a number joined hands, and the person at one extremity of the circle took hold of, or touched the fish, and the person at the other extremity

extremity put his hand into the water, over the body of the fish. The shock was communicated through the whole circle as smartly as if both the extreme persons had touched the fish. In this it seems to differ widely from the torpedo, or else we are much misinformed of the manner in which the benumbing effect of that fish is communicated. The shock which our Surinam fish gives, seems to be wholly electrical; and all the phænomena or properties of it exactly resemble those of the electric aura of our atmosphere when collected, as far as they are discoverable from the several trials made on this fish. This stroke is communicated by the same conductors, and intercepted by the interposition of the same original electrics, or electrics *per se*, as they used to be called.

"The keeper of these fish informs me, that he caught them in Surinam river, a great way up, beyond where the salt water reaches; and they are a fresh-water fish only. He says that they are eaten, and by some people esteemed a great delicacy. They live on fish, worms, or any animal food, if it is cut small, so that they can swallow it. When small-lived fishes are thrown into the water, they first give them a shock, which kills, or stupifies them, that they may swallow them easily, and without any trouble. If one of these small fishes after it is shocked, and to all appearance dead, be taken out of the vessel where the electrical fish is, and put into fresh water, it will soon revive again. If a larger fish than they can swallow, be thrown into the water at a time that they are hungry, they give him some smart shocks, till he is apparently dead, and then try to swallow or suck him in; but after several attempts, finding he is too large, they quit him. Upon the most careful inspection of such fish, I could never see any mark of teeth, or the least wound or scratch on them. When the electrical fish are hungry, they are pretty keen after their food; but they are soon satisfied, not being able to contain much at a time. An electrical fish of three feet and upwards in length, cannot swallow a small fish above two or at most three inches and a half long. Since I wrote the above description and remarks, I have had Mr. Bancroft's Essay on the Natural History of Guiana put into my hands, in which I find an account of this animal; but as I think he has not been very particular in the description of it, I resolved still to send you the above account, that you might judge for yourself. I observe, that his account, or description, and mine differ in several things, and amongst others, where he says, that those fish were usually about three feet in length; but the one, of which I have sent a slight description, was three feet eight inches. This small variation might indeed have happened without any error; but I am told, that some of them have been seen in Surinam river upwards of twenty feet long, whose stroke or shock proved instant death to any person that unluckily received it."

NATURAL HISTORY of the THORNBAC.

THE Thornback differs from the skate, in being less, and in being armed with a greater number of spines or prickles, from whence it has its name. It has one row on the back, and three on the tail. Mr. Pennant mentions a large one that he had seen, which had three rows on the back, and five on the tail. The shape of the body, exclusive of the tail, is nearly square, and yet a transverse line, drawn from corner to corner, is longer than a line drawn from the head to the root of the tail, so that the fish may in reality be said to be broader than it is long. It has no scales, but is covered with a kind of slime, which renders it extremely slippery. The upper part is of a dusky colour, spotted with

white, and the belly is entirely white; the eyes are very prominent, and placed on the upper part of the head, having no bone or any thing else to defend them. On the nose, and on the inner side of the forehead, near the eyes, are a few prickles; and others are irregularly scattered on the upper part of the pectoral fins.

If a Thornback is placed with the belly uppermost, the nostrils appear, and are contiguous to the mouth, which is destitute of teeth; but the jaw-bones are as rough as a file. The gills, as in other fish of this kind, consist of five holes, placed in a semicircular form; and there are two semicircles on the lower part of the fish, one encompassing the breast, and the other the lower belly, which is divided from the upper by a bone, where these circles touch.

The young fish have very few prickles on them, and their backs are often spotted with white, each spot being encircled with black. Thornbacks are sometimes found to weigh fourteen or fifteen pounds, but with us they seldom exceed eight.

They frequent our sandy shores, and are very voracious; they feed on all sorts of flat fish, and are particularly fond of herrings and sand eels. Sometimes they feed upon crustaceous animals, such as crabs, &c. They begin to generate in June, and produce their young in July and August, which (as well as those of the skate) are called *Maids*, before they are old enough to breed. In November the Thornback begins to be in season, and continues so later than the skate, but the young of both are good at any time of the year.

The flesh of the Thornback resembles that of a skate, but is less delicate, and harder of digestion: but the liver is considered by some as a great delicacy.

NATURAL HISTORY of the STING RAY, or FIRE FLARE.

THIS is distinguished from other cartilaginous fish, in having a remarkable spine on the tail, which is a formidable weapon. The tail is very thick at the beginning; the spine is placed about a third the length of the former from the body, and is about six inches long, flat on the top and bottom, very hard, and sharp-pointed, the two sides of which are thin, and sharply bearded the whole way. The tail, which extends about four inches beyond the end of this spine, gradually becomes slender at the extremity.

The spine, with which nature has armed this fish, has occasioned the ancients to give many tremendous fables concerning it. Pliny, Ælian, and Opius, have given it a venom that affects even the inanimate creation. But there is not the least credit to be given to the account of its venomous qualities; though it is still believed by fishermen in several parts of the kingdom. Considered, indeed, as a weapon of defence, it is capable of giving a dangerous wound, when it falls on a tendinous part, or on a person in a bad habit of body. As to any fish having a spine charged with actual poison, we must beg leave to refuse our assent to it, though the opinion is sanctified by the name of Linnæus.

This species shed their spine, and renew them annually; and the new spine sometimes appears before the old one drops off, on which account the Cornish people call it the Cardinal Trilost, or three tailed.

The Sting Ray does not grow to the bulk of the others; the eyes are large, and placed in the upper part of the head, and the mouth in the lower. It has a hole behind each eye; the mouth is large, and placed transversely, and the nose is long and sharp-pointed.

pointed. The apertures on the gills are five on each side, beginning a little below the mouth, and extending to the breast. The sides are terminated, throughout their whole length, by a broad fin.

The body is quite smooth, and almost of a circular shape; it is thicker in the middle than any other Ray, but grows very thin towards the edges. The upper part of the body is of a dirty yellow colour, the middle part of a dullish blue; the lower side white, and the tail and spine dusky.

NATURAL HISTORY of the ANGEL FISH.

THIS is also called the monk-fish, and is of a middle nature between rays and sharks, partaking something of the character of both, though it is an exception to each in the situation of the mouth, which is placed at the extremity of the head; it grows to a very large size, and sometimes weighs upwards of one hundred and fifty pounds. The back and sides are of a dirty ash-colour, and very rough; and the belly is white. The head is roundish at the extremity, and in each jaw there are three rows of teeth, each row consisting of eighteen; but the number is not exactly the same in all fish of this kind; Mr. Pennant mentions one that had five rows of teeth all round the jaws. Like those of all sharks, the animal can raise or depress them at pleasure, by means of muscles uniting them to the jaws, not being lodged in sockets as the teeth of cetaceous fish are. The tongue is broad, and sharp at the end; and the nostrils, which are placed on the upper lip, are wide, and filled with a kind of slime; the eyes are smallish, and behind each is a semi-lunar orifice. Instead of gills, it has five holes like the thornback. It has two fins, placed near the head, which resemble wings, and is therefore called the Angel Fish; angels being represented with wings, the ventral fins are placed in the same manner.

This fish is frequently found on our coasts, where it prowls about for prey, like others of the kind. It is extremely voracious, and, like the ray, feeds on flat-fish and flounders, which keep near the bottom of the water. It is extremely fierce, and dangerous to be approached. Mr. Pennant acquaints us of an instance of a fisherman, whose leg was terribly torn by a large one of this species, which lay within his nets in shallow water, and which he went to lay hold of incautiously.

These, as well as the rest of the genus, have much malignity in their aspect: their eyes, which are oblong, sunk into their head, and over-hung by their skin, seem fuller of malevolence than fire.

Their skin, which is very rough, was used by the ancients to polish wood and ivory, for which purposes the moderns use that of the greater dog-fish. The flesh was formerly thought a delicacy, but is now neglected even by the poorest people, on account of its coarseness and rankness.

NATURAL HISTORY of the PICKED DOG-FISH.

THIS fish has its name from a strong sharp spine, placed before each of the back fins, which distinguishes it from the rest of the British sharks. It has a roundish oblong body, which is covered with a rough skin: the back is of a brownish ash-colour, and the belly is white, and smoother than the other parts: the eyes are oblong, and covered with a double membrane. The mouth is placed just under the eyes, and is armed with a double row of small teeth, which bend from the middle of each jaw towards the corners of the mouth. The nose is long, and extends greatly beyond the mouth, but is blunt at the end. It has no fin on

the lower part of the body, between the vent and the tail, by which it may be distinguished from all other fish of this kind. It grows to the weight of about twenty pounds, and is frequently taken in the British ocean and the Irish sea.

The SMOOTH DOG FISH.

This fish is destitute of teeth, but to supply the defect, the bones of each jaw are as rough as a file. The skin, as its name implies, is smooth, but that of all others of this kind is rough: by this difference it may be readily distinguished from the picked Dog-Fish.

NATURAL HISTORY of the FISHING FROG, or FROG FISH.

THE Frog-Fish resembles a tadpole or young Frog in shape, but it appears a tadpole of enormous size; for it sometimes exceeds five feet in length, and has a mouth above a yard wide. Its deformity is not to be exceeded: the head is considerably larger than the whole body; the under jaw projects beyond the upper, and both are armed with sharp slender teeth: there are also teeth in the palate, and at the root of the tongue, which is large and broad; the eyes are placed at the top of the head, and are encompassed with prickles: immediately above the nose are two long strings or filaments, which resemble a fishing-line, and it is said the animal converts them to the purposes of fishing. The back is flat, and greyish, with somewhat of a reddish and greenish cast: it has three bristles or strings on the middle of the back, which seem to supply the place of a fin; and several strings, resembling fins, hang round the body: two fins are placed under the throat, which resemble the feet of a mole, by the assistance of which they creep at the bottom of the sea.

The flesh of the Frog-Fish is white, when boiled, and tastes like that of a Frog. The fishermen have, in general, a great regard for this ugly fish, as it is an enemy to the dog-fish; the bodies of those voracious animals being frequently found in its stomach; and, whenever they take it, they make a point of giving it its liberty.

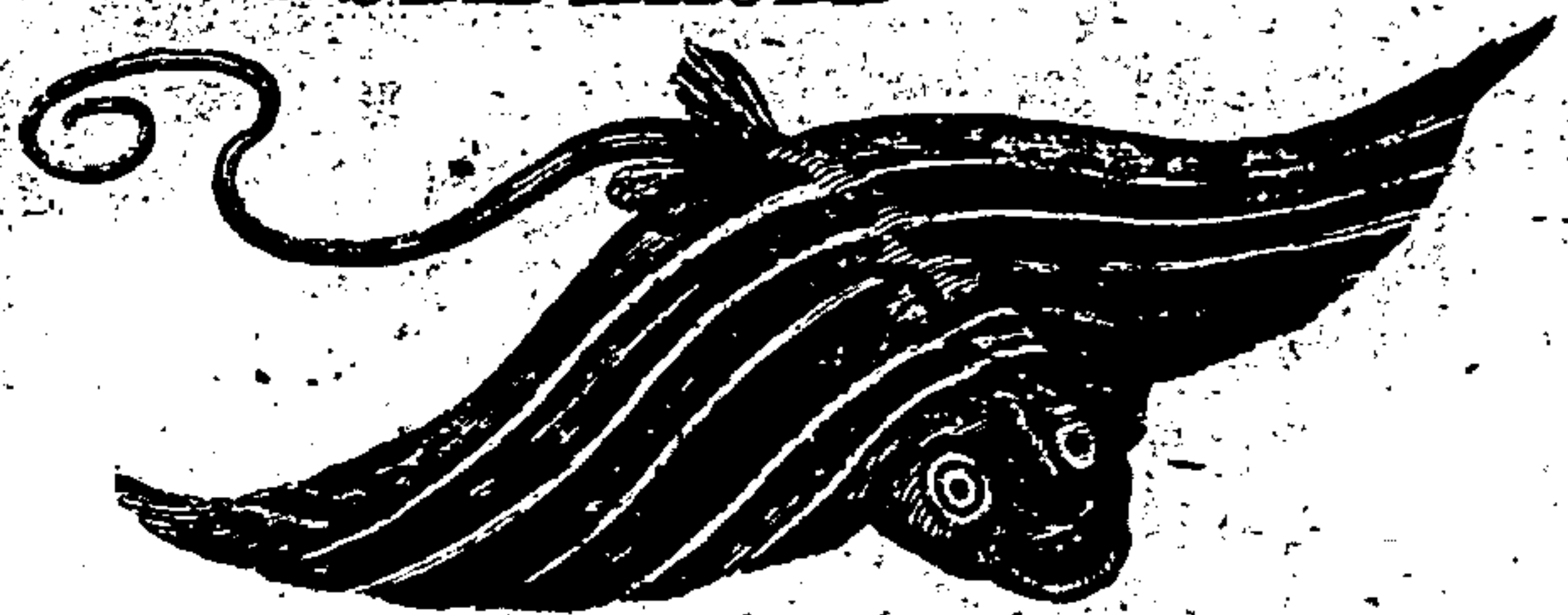
NATURAL HISTORY of the WHITE SHARK.

OF all the inhabitants of the deep, those of the Shark kind are the fiercest and the most voracious; but the great White Shark, which is the largest of the kind, joins, to the most amazing rapidity, the strongest appetites for mischief. In size, he approaches nearly to the whale, and far surpasses him in celerity and strength, in the formidable arrangement of his teeth, and his insatiable desire of plunder. Gillius informs us, that the Great White Shark will grow to the weight of four thousand pounds, and that in the body of one of them a human body was found entire.

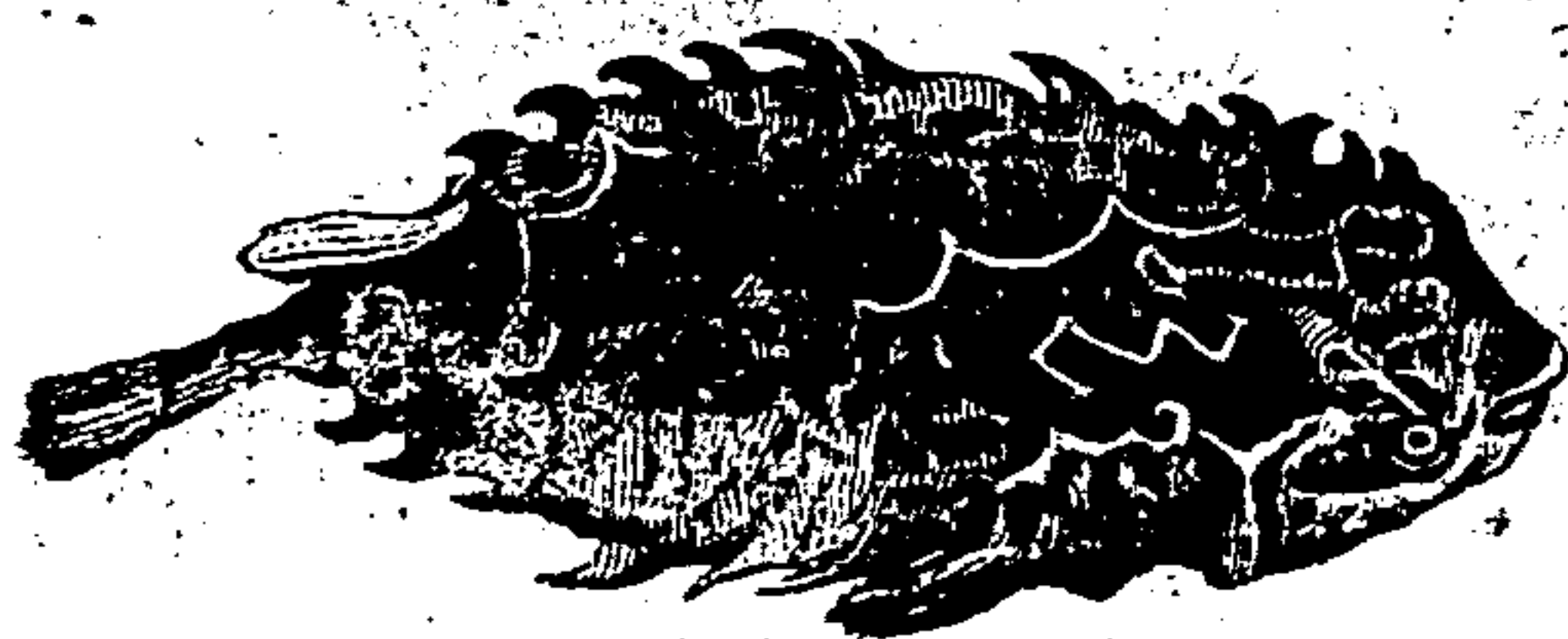
The head is large and flattish; the eyes are also large, and the snout is long. The mouth is enormously wide, placed far beneath, and therefore these, as well as the rest of the Shark kind, are said to be obliged to turn on their backs to seize their prey; which is an observation as ancient as the days of Pliny. The throat is extremely wide, and capable of swallowing a man with the greatest ease. But its furniture of teeth is still more terrible: of these there are six rows, which are flat, triangular, exceedingly sharp at their edges, and finely serrated. It is said there are seventy-two in each jaw, but many are of opinion, that their number is uncertain; and that these terrible instruments of destruction increase in

FISHES.

SEA EAGLE

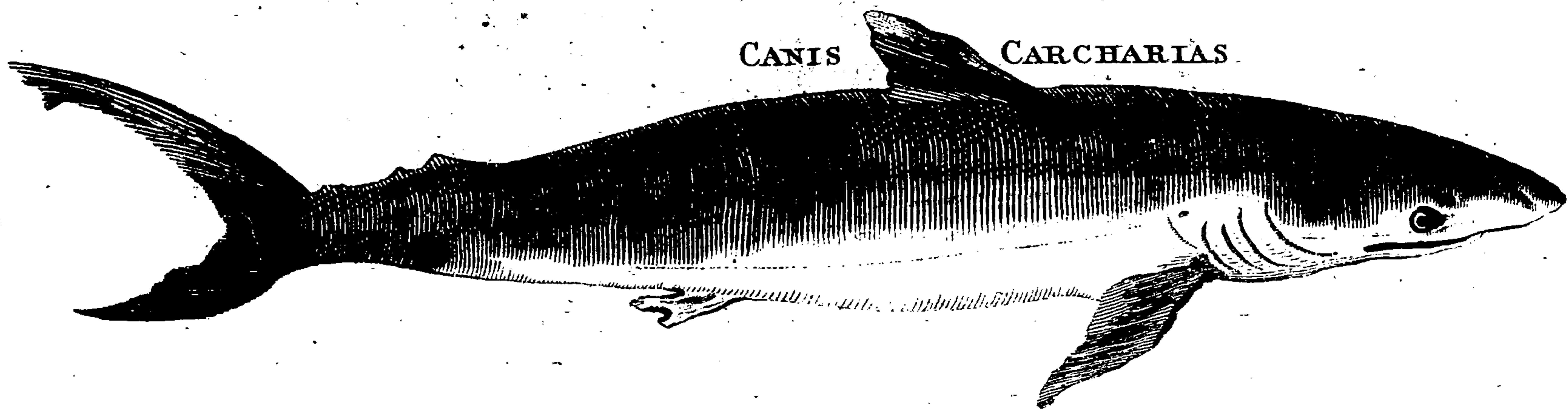


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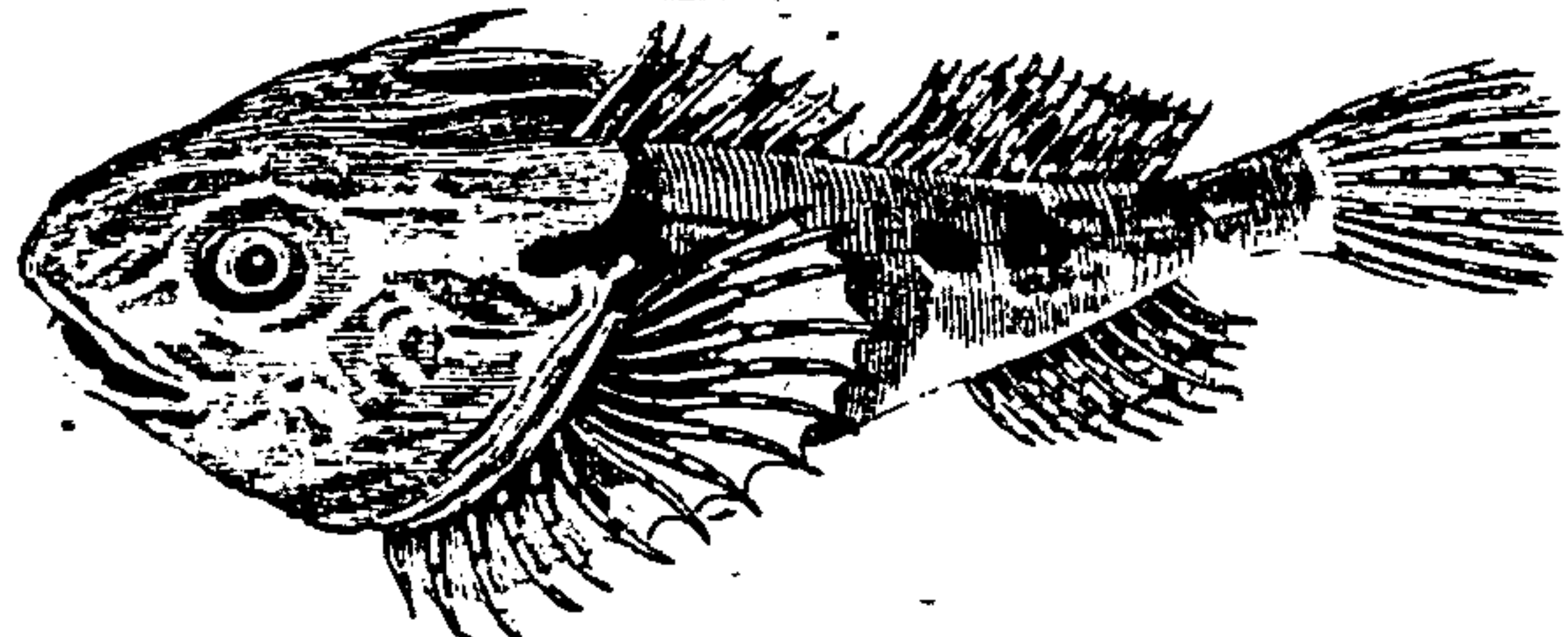


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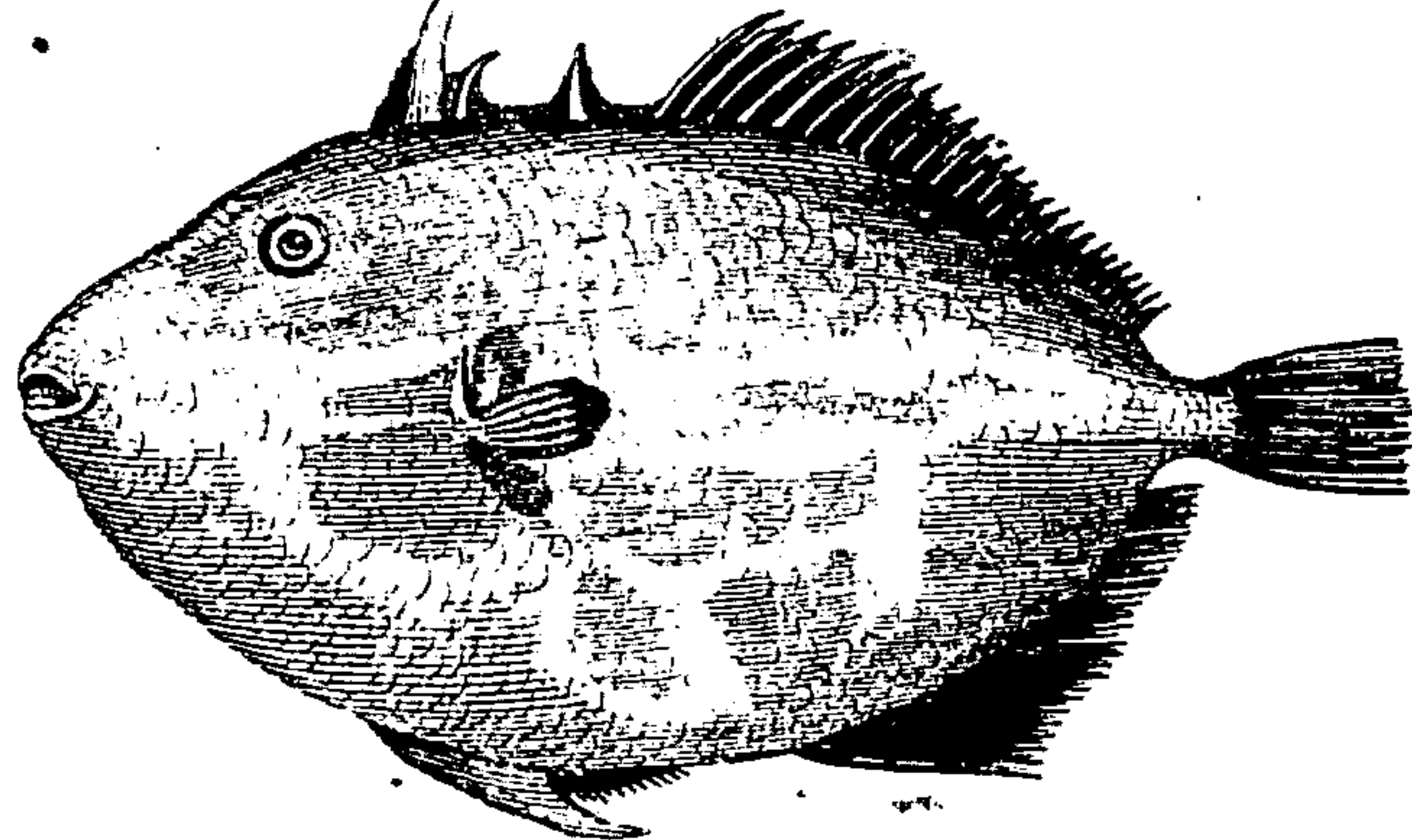
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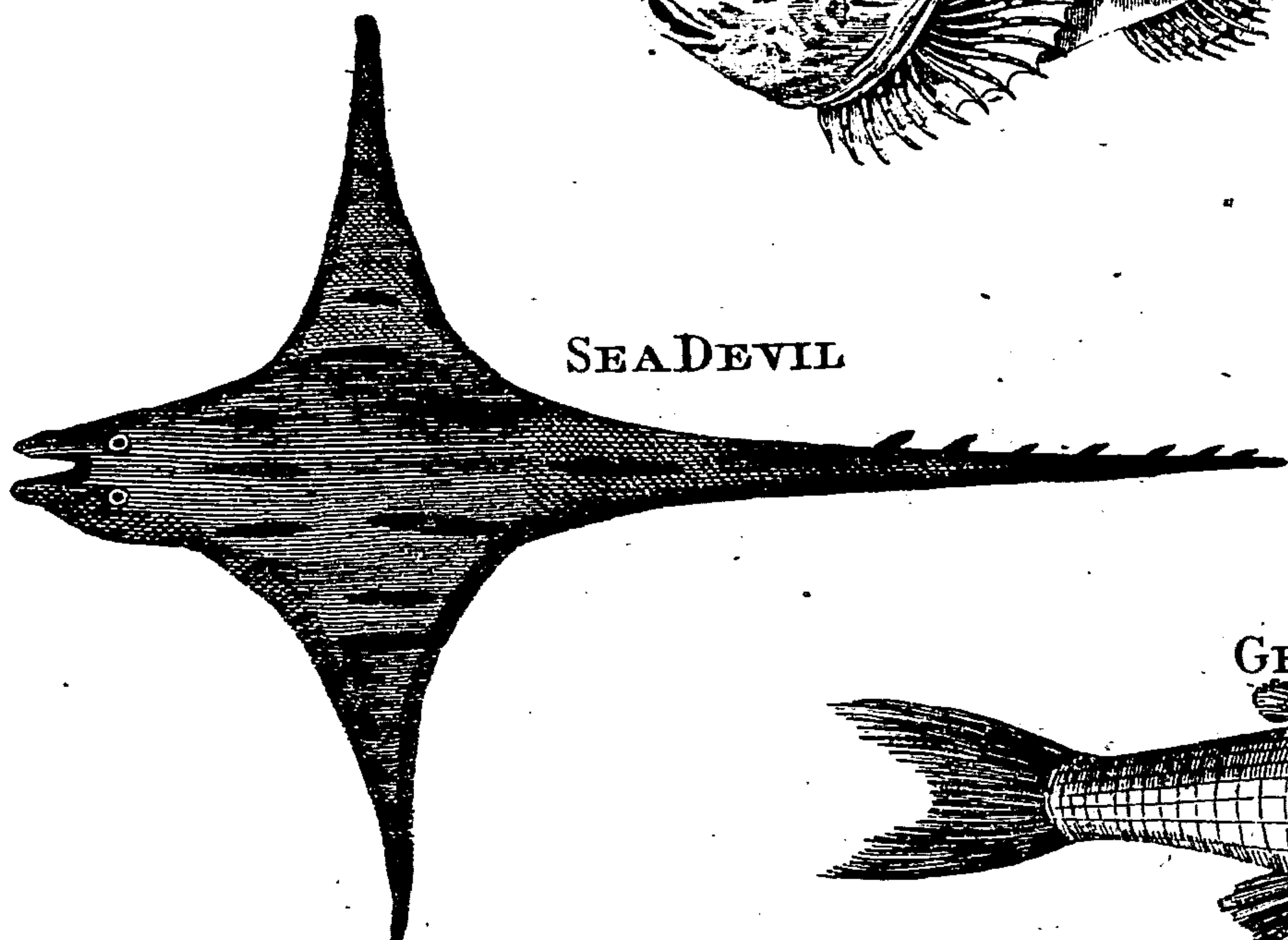
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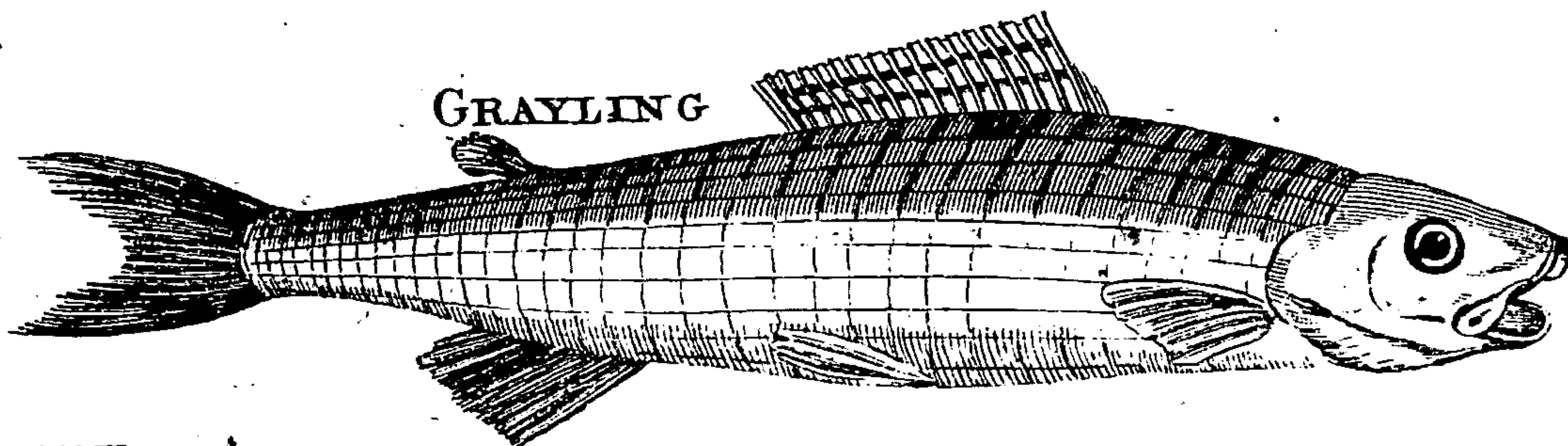
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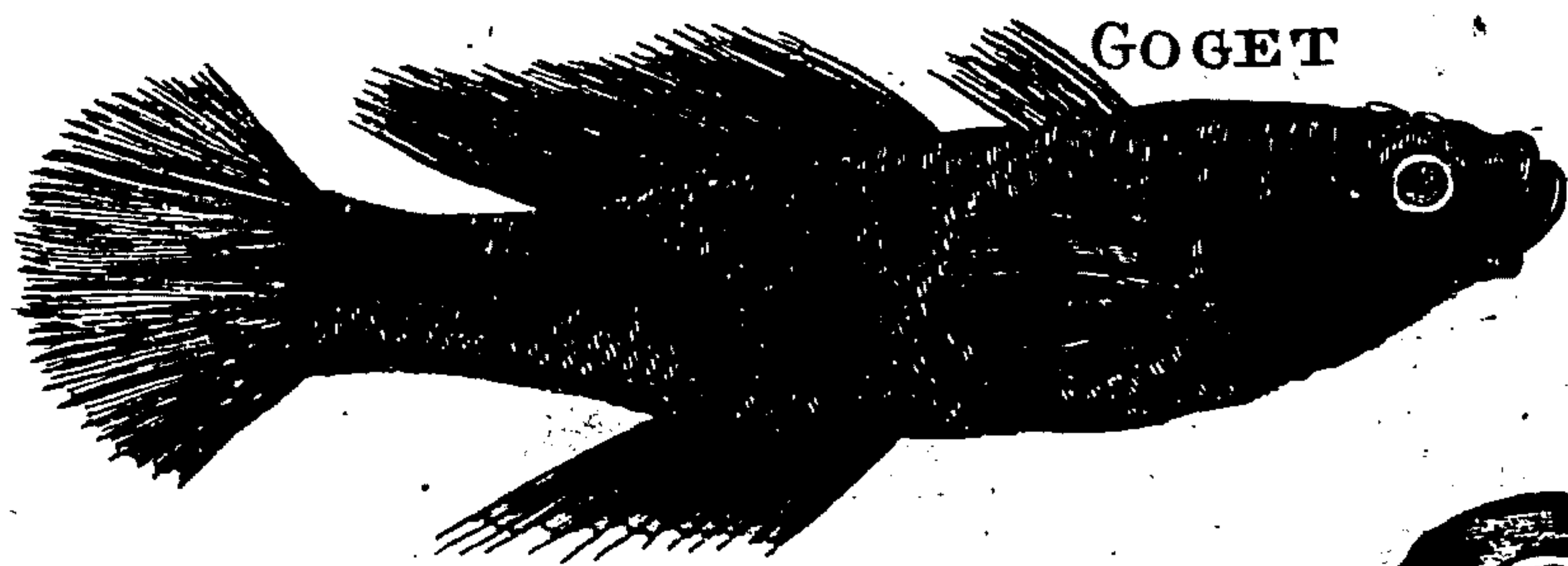
SEA DEVIL



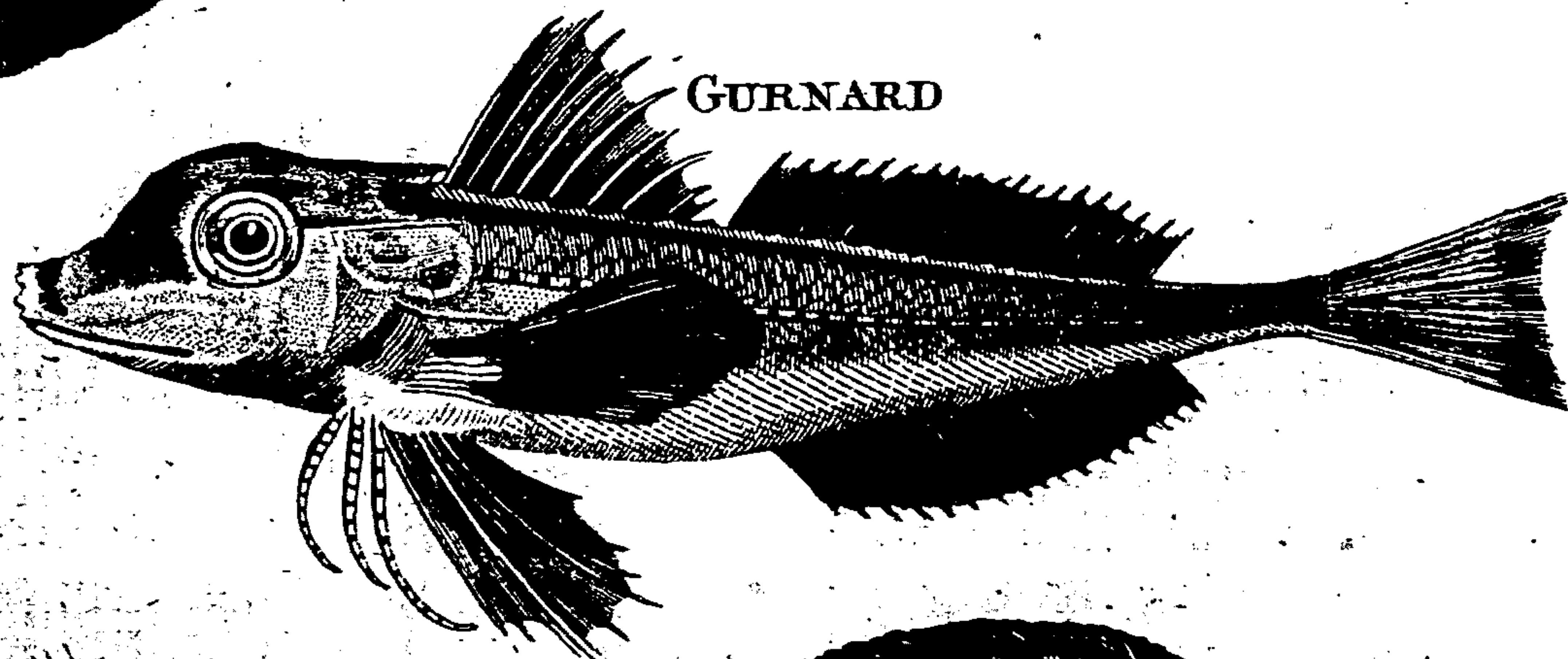
GRAYLING



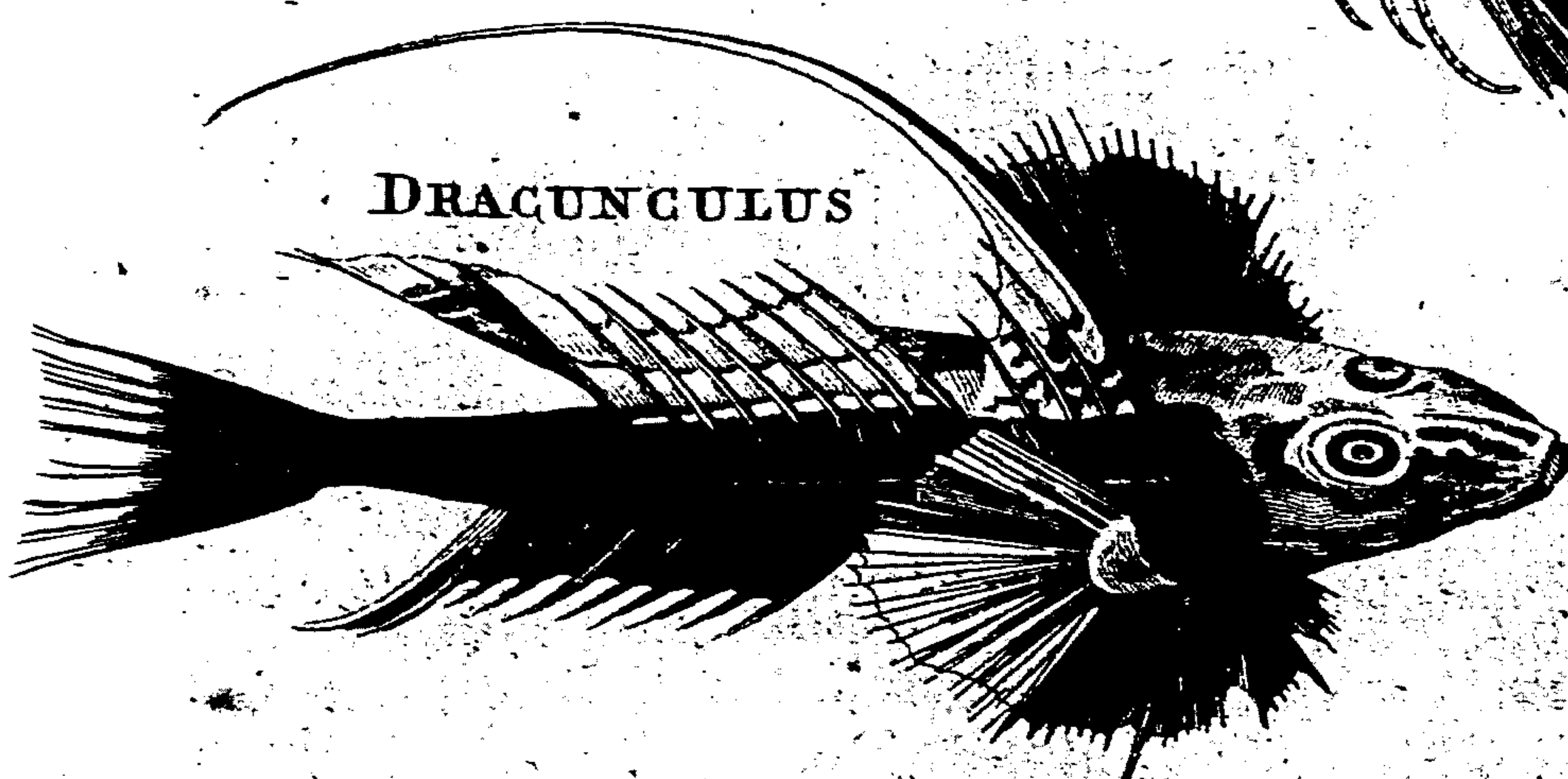
GOGET



GURNARD



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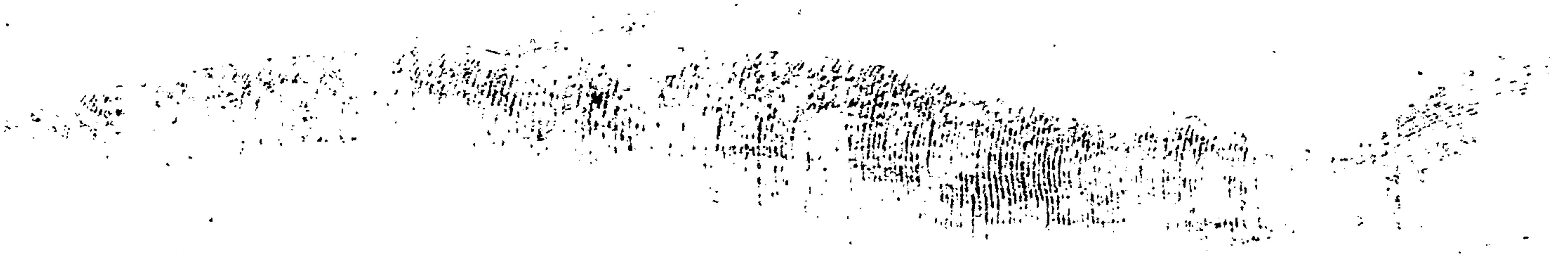


SEA EEL



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proportion as the animal grows older. When the fish is in a state of repose, this dreadful apparatus lie flat in the mouth; but, when it seizes its prey, it has a power of erecting them, by the assistance of a set of muscles that join them to the jaw.

The other parts of this fish are almost equally terrible to behold. Its pectoral fins are very large; it is furnished with large goggle eyes, which it turns with pleasure on every side, and can behold its prey behind it as well as before: its whole aspect is marked with a character of malignity. The tail is of a semi-lunar form, but the upper part is longer than the lower. It has vast strength in the tail, and can strike with amazing force; on which account the sailors cut it off with an ax as soon as they have got it on board. The colour of the whole body and fins of this animal is a light grey; its skin is rough, hard, and prickly; and is that substance that covers instrument cases, called shagreen.

The Shark is as dreadful from his courage and activity, as from his formidable appearance: no fish can swim faster, none are so constantly employed in swimming; he outstrips the swiftest ships, plays round them, and seems to gaze at the passengers, without exhibiting the smallest symptom of an effort to proceed.

The depredations this animal commits are frequent and formidable: in all hot climates he is the dread of the sailors, where he constantly attends the ships in expectation of what may fall overboard. Dr. Goldsmith relates, that as a sailor was bathing in the Mediterranean, near Antibes, in the year 1744, while he was swimming about fifty yards from the ship, perceived a monstrous fish approaching him: struck with terror at his approach, the poor man cried out to his companions in the vessel to take him on board; immediately they threw him a rope, and were drawing him up the ship's side, when the Shark darted after him, and bit off one of his legs. Indeed when a man has the misfortune to be pursued by any of these animals, he perishes without redemption; they having been perceived to dart at them like gudgeons at a worm. "A master of a Guinea ship," says Mr. Pennant, "informed me, that a rage of suicide prevailed among his new-bought slaves, from a notion the unhappy creatures had, that after death they should be restored again to their families, friends, and country. To convince them at least that they should not re-animate their bodies, he ordered one of their corpses to be tied by the heels to a rope, and lowered into the sea; and, tho' it was drawn up again as fast as the united force of the crew could be exerted, yet in that short space the Sharks had devoured every part but the feet, which were secured at the end of the cord."

So great is the rapacity of the Shark, that nothing which has life is rejected by it: but human flesh appears to be its most favourite food; when once it has fed upon mankind, it continually haunts those places where it expects a return of its prey: it is however asserted, that this voracious fish will take the black man's flesh in preference to the white, and that when men of different colours are in the water together, it always makes choice of the former.

The usual method of taking a Shark, is to bait a hook with a piece of beef or pork, which the sailors throw into the sea affixed to a strong cord, strengthened near the hook with an iron chain; as without such precaution the Shark would presently bite the cord in two, and set himself at liberty. He approaches it, swims round it, and examines it, and appears for a time to neglect it; but when the sailors make a pretence, by drawing the rope, as if intending to take the bait away, then his hunger excites him, he darts at the bait, and swallows it,

No. 25.

hook and all. When he finds the hook lodged in his maw, he exercises his utmost efforts to continue in his natural element; but, when his strength is exhausted, he suffers his head to be drawn above water, the sailors confine his tail by a noose, draw him on ship-board, and dispatch him as soon as possible, by beating him on the head; yet even this is attended with difficulty and danger; the enormous creature, terrible even in the agonies of death, still struggles with his destroyers, and is the most difficult to be killed of any animal in the world.

Belonius assures us, that he saw a female Shark produce eleven live young ones at a time, and that the female in this tribe is larger than the male.

The ancients were acquainted with this fish: Opius, in particular, gives a long and very entertaining account of its capture. Their flesh, which is sometimes eaten, is exceedingly coarse and rank, and hardly digestible by any but the negroes, who are remarkably fond of it: the liver affords three or four quarts of oil; and the skin, as we have already observed, is polished into that substance, known among us by the name of shagreen.

The BLUE SHARK.

The back of this animal is of a lively blue colour, and the belly of a silver white: it is of an oblong form, and from six to eight feet in length: the skin is smoother than that of other Sharks: the snout is long, sharp, flat, and indented with many small holes above and below: the mouth is large, and placed like that of the white Shark, but it is not furnished with so many teeth.

Ælian says this species will permit the small brood, when in danger, to swim down its mouth, and take shelter in its belly. This fact is confirmed by Rondeletius; and, as Mr. Pennant observes, it is no more incredible, than that the young of the opussum should seek an asylum in the ventral pouch of its parent; a fact too well known to be contested. It is probable, that this degree of affection is not peculiar to the Blue Shark, but common to the whole genus.

The blue Shark frequents many of our coasts, particularly those of Cornwall during the pilchard season. Though Rondeletius says he was an eye-witness to its fondness for human flesh, yet it is less destructive in our seas, owing perhaps to the coolness of the climate, which is known to abate the fierceness of some animals, and the venom of others.

NATURAL HISTORY of the SEA FOX, or SEA APE.

THIS animal is called the Sea Fox on account of the length of its tail, and the rank smell of its flesh, which is not unlike that of the Fox. It is sometimes found so large as to weigh upwards of an hundred pounds, and has a round short body, and a small mouth a little below the snout, which is sharp, and armed with teeth. The belly of this fish is white, and the back of an ash colour. This fish is principally remarkable for the great length of its tail, which resembles a sword, is as long as the whole body, and has a fin at the root of it. It is usually met with in the Mediterranean sea, and is sometimes taken in our seas. Some imagine it to be the fish called the thresher, from its attacking and overcoming the grampus with its long tail, whenever that species of whale rises to the surface to breathe.

NATURAL HISTORY of the TOPE.

THE fins, and the upper part of the body of this fish, is ash coloured; the belly is white: the nose is very long, flat and sharp pointed, and the nostrils

nostrils are placed very near the mouth: the eyes have small pupils in proportion to the bulk of the body, and behind each eye is a small orifice. The teeth, which are very numerous, are small, sharp, triangular, and serrated on their inner edge: they are disposed in three rows. Its skin and flesh has a rank and offensive smell. Mr. Pennant mentions one that was taken on our coast in the year 1768, which weighed twenty-seven pounds, and was five feet in length; but they grow to a much larger size, and sometimes exceed an hundred pounds in weight. This is very fierce and voracious, and will even pursue its enemy to the edge of the shore.

NATURAL HISTORY of the SAW FISH.

THIS animal has its name from a saw, which the bones of its nose is supposed to resemble; but they bear a greater similitude to the teeth of a comb, placed at some distance from each other: they are placed on each side of the bone, and are from twenty to thirty in number, and some of them are near five feet in length, when the body of the fish is about ten feet. The back of this fish is of an ash colour, and the belly white: it has no teeth in its mouth, which is transversely cleft, but the lips are as rough as a file. The Saw Fish has no fins on the back, and four on the belly, two on each side, those next the head being the broadest and longest. The eyes stand high out of the head, and the mouth is directly underneath the eyes: the nostrils are oblong. These animals are great enemies to the whale and fin-fish; many of them assembling round one, which they never quit till they have destroyed. They feed only on his tongue; and leave the rest behind. The Saw Fish inhabits different parts of the ocean, but in the north seas they are found in the greatest plenty; perhaps because great numbers of whales inhabit those seas.

NATURAL HISTORY of the STURGEON.

THE Sturgeon grows to the length of eighteen feet, and to the weight of five hundred pounds, but it is seldom taken in our rivers of that bulk. The nose is very long, slender, and ends in a point; on the lower part of the nose are four beards: the mouth, which is situated far beneath, is small, and unsupported by any jaw-bones; neither is it furnished with any teeth. The eyes are extremely small, and the nostrils are placed near them. The whole under-side of the fish, from the end of the nose to the vent, is entirely flat; and on the back is a single fin, not very remote from the tail. It has also two pectoral fins, two ventrals, and one anal fin. The upper part of the body is of a dirty olive colour; the lower part silvery, and the middle of the tubercles white. It is an exception among the cartilaginous fish in the manner of breeding, being like the bony fish oviparous, spawning in winter.

In its general form it resembles a fresh-water pike. Though it is harmless and ill provided for war, the body is formidable enough to appearance. It is long, pentagonal, and covered with five rows of large bony knobs, one row on the back, and two on each side, and a number of fins to give it greater expedition. Of this fish there are three kinds; the common Sturgeon, the caviare Sturgeon, and the Huso, or Isinglass Fish. The first has eleven knobs or scales on the back; the second has fifteen; and the latter thirteen on the back, and forty-three on the tail. These differences seem slight to us who only consider the animal's form; but those who consider its uses find the distinction of considerable importance. The first is the Sturgeon, the flesh of

which is sent pickled into all parts of Europe. The second is the fish from the roe of which that celebrated delicacy called caviare is made; and the third, besides supplying the caviare, furnishes also the valuable commodity of isinglass. They all grow to a very large size.

This fish visits every country in Europe at different seasons; it annually ascends the largest rivers to spawn, and propagates in an amazing number. The inhabitants along the banks of the Po, the Danube, and the Walga, make great profit annually of its incursions up the stream, and have their nets prepared for its reception. The Sturgeon also is brought daily to the markets of Rome and Venice, and they are known to abound in the Mediterranean sea. Yet those that keep entirely either in salt or fresh water are but comparatively small. When the Sturgeon enjoys the vicissitude of fresh and salt water, it is then that it grows to an enormous size, so as almost to rival even the whale in magnitude.

England receives frequent visits from this much esteemed fish. It is often accidentally taken in our rivers in salmon nets, particularly in those parts that are not far remote from the sea. The largest we have heard of caught in Great Britain, was a fish taken in the Eske, where they are most frequently found, which weighed four hundred and sixty pounds. An enormous size to those who have only seen our fresh water fishes.

North America also furnishes the Sturgeon; their rivers in May, June, and July, supply them in very great abundance. At that time they are seen sporting in the water, and leaping from its surface several yards into the air. When they fall again on their sides, the noise is heard in still weather at some miles distance.

But the greatest numbers are to be found in the lakes of Frischehoff and Curischaff, near the city of Pillau. The adjacent shores are formed into districts, and farmed out to companies of fishermen, some of which are rented for six thousand gilders per annum. In the rivers also that empty themselves into the Euxine Sea, this fish is caught in great numbers, particularly at the mouth of the river Don. In all these places the fishermen regularly expect their arrival from the sea, and have their nets and salt ready prepared for their reception.

As the Sturgeon is not a voracious fish, it is never caught by a bait in the ordinary manner of fishing, but always in nets. From the description given above of its mouth, it is not to be supposed that the Sturgeon would swallow any hook capable of holding so large a bulk and so strong a swimmer. Indeed it never attempts to seize any of the finny tribe, but lives by rooting at the bottom of the sea, where it makes insects and sea-plants its whole subsistence. From this quality of floundering at the bottom it has received its name; which comes from the German verb *stoeren*, signifying to wallow in the mud. It is obvious to all those who cut it open, that it does not subsist upon large animals, for nothing is found in its stomach but a kind of slimy substance; whence some imagine it lives only upon air and water. Hence arose a German proverb, applied to a man extremely temperate, when they say he is as moderate as a Sturgeon.

The Sturgeon is as timid in its nature as temperate in its appetites. There would be scarce any method of taking it, did not its natural desire of propagation induce it to incur so great a variety of dangers. The smallest fish is alone sufficient to terrify a shoal of Sturgeons; for, being unfurnished with any weapon of defence, they trust entirely to their swiftness, and their caution for security. Like all animals that do not make war upon others, Sturgeons live in society among themselves; rather for the purposes of pleasure, than from any power of mutual

mutual protection. Gerner asserts, that they are delighted with sounds of various kinds; and that he has seen them shoal together, at the notes of a trumpet.

The usual time for the Sturgeon to come up rivers to deposit its spawn, is about the beginning of summer, when the fishermen of all great rivers make a regular preparation for its reception. The nets in which the Sturgeon are caught, are made of small cord, and placed across the mouth of the river; but in such a manner that, whether the tide ebbs or flows, the pouch of the net goes with the stream. The Sturgeon thus caught, while in the water, is one of the strongest fishes that swim, and often breaks the net to pieces that incloses it; but the instant it is raised with its head above water, all its activity ceases: it is then a lifeless, spiritless lump, and suffers itself to be tamely dragged on shore. It has been thought prudent, however, to draw it to shore gently; for, if excited by any unnecessary violence, it has been found to break the fishermen's legs with a blow of its tail. The most experienced fishers, therefore, when they have drawn it to the brink, keep the head always elevated, which prevents its doing any mischief with the hinder part of the body: others, by a noose, fasten the head and tail together: and thus, without immediately dispatching it, bring it to the market, if there be one near; or keep it till their number is completed for exportation.

The flesh of the Sturgeon, pickled, is very well known at all the tables of Europe; and is even more prized in England, than in any of the countries where it is usually caught. The fishermen have two different methods of preparing it. The one is by cutting it in long pieces lengthwise, and having salted them, hang them up in the sun to dry: the fish thus prepared, is sold in all the countries of the Levant, and supplies the want of better provision. The other method, which is usually practised in Holland, and along the shores of the Baltic, is to cut the Sturgeon crosswise into short pieces, and put it into small barrels, with a pickle made of salt and saumure. This is the Sturgeon which is sold in England; and of which great quantities came from the north, until we gave encouragement to the importation of it from North America. From thence we are very well supplied; but it is said, the fish are inferior to those imported from the north of Europe.

A considerable trade is also carried on with the roe of the Sturgeon, which is salted and preserved in a peculiar manner, and called Caviare: it is made from the roe of all kinds of Sturgeon, but particularly the second. This is much more in request in other countries of Europe than with us. To all these high-relished meats, the appetite must be formed by degrees: and tho' formerly, even in England, it was frequently served at the politest tables, it is at present sunk entirely into disuse. It is still, however, a considerable merchandize among the Turks, Greeks, and Venetians. Caviare somewhat resembles soft soap in consistence; but it is of a brown, uniform colour, and is eaten as cheese with bread. The manner of making it is this: they take the spawn from the body of the Sturgeon, and freeing it from the small membranes that connect it together, they wash it with vinegar, and afterwards spread it to dry upon a table; they then put it into a vessel with salt, breaking the spawn with their hands, and not with a pottle; this done, they put it into a canvas bag, letting the liquor drain from it; lastly, they put it in a tub, with holes in the bottom, so that, if there be any moisture still remaining, it may run out: then it is pressed down, and covered up close for use.

But the Huis, or Hinglats fish, is caught in great

quantities in the Danube, from October to January: it is seldom under fifty pounds weight, and often exceeds four hundred: its flesh is soft, glutinous, and flabby; but it is sometimes salted, which improves the taste of it, and then it turns red like salmon. It is for the commodity it furnishes, that it is chiefly taken. Its linglats is of a whitish substance, inclining to yellow, done up into rolls, and so exported for use. It is serviceable not only in medicine, but many arts. The varnisher, the wine merchant, and even the clothier, are acquainted with its uses; and very large sums are yearly expended upon this single article of commerce. They make it thus: they cut the skin, the entrails, the fins, and the tail of this fish, into small pieces; these are left to macerate in a sufficient quantity of warm water, and they are all boiled shortly after with a slow fire, until they are dissolved and reduced to a jelly; this jelly is spread upon instruments made for the purpose; so that drying, it assumes the form of parchment; and, when quite dry, it is then rolled into the form which we see it in the shops.

This valuable commodity is principally furnished from Russia, where they prepare great quantities surprisingly cheap. The ancients were acquainted with the fish that afforded this drug. Pliny mentions it under the name of Ichthyocolla, and says, that the glue which was produced from it had the same title; and afterwards adds, that it was made out of the belly of the fish.

Sturgeon, says Lemery, was much esteemed by the ancient Romans, and the belly is reckoned best. It contains much oil and volatile salt, and yields a nourishing and solid food, because of its thick and gross juices. It is also hard, toughish, fat, and difficult of digestion; and therefore it is injurious to weak and tender persons; and those who are sick or recovering from illnesses. As Sturgeon is fat, it relaxes the fibres of the stomach and bowels, and renders the body a little soluble. The bones of this fish, taken to the quantity of a dram, are looked upon to be opening, good for rheumatism and the gravel; they extract what is called mouth or water-glue from it, which is not so soon dissolved as the common sort, but produces the same effects.

NATURAL HISTORY of the SUN FISH.

IT has a broad short body, covered behind with a circular fin, which answers the purpose of a tail, so that it has the appearance of a bulky head, and the body seems to have been cut off in the middle. Its ordinary length is about ten feet, though it is sometimes found to weigh upwards of an hundred pounds. It has a large rough thick skin, but no scales: the back is blackish, and the belly of a silver white; but both the belly and back terminate in a sharp ridge. In proportion to the size of the fish, the mouth is very small, and when opened is roundish. The jaws, which are hard and rough, are armed with several rows of sharp teeth. The eyes are small, and before each is a semi-circular aperture; the pectoral fins are very small, and placed behind them. The dorsal and the anal fins are high, and placed at the extremity of the body: the tail fin is narrower.

Here seems to be no satisfactory reason for calling this animal the Sun-fish: perhaps from the roundness of its body, or from its shining in the night. It is found in the Mediterranean sea, in the ocean, and on the coasts of Cornwall. A fish of this kind was taken near Plymouth, in 1734, which weighed five hundred pounds.

When boiled, it becomes a glutinous jelly, resembling boiled starch when cold, and serves the purposes of glue.

The SHORT SUN FISH.

This is much shorter and deeper than the other: the back and the anal fins are higher, and the aperture on the gills is not semi-circular, but oval. The situation of the fins are the same in both. Though both these kinds are taken on the western coasts of this kingdom, they are much more numerous in the warmer parts of Europe.

NATURAL HISTORY of the LUMP FISH.

THIS is also called the sea-owl, and in Scotland the cock-paddle. This singular fish increases to the weight of four pounds, and the length of sixteen inches: the shape of the body is like that of the bream, deep, but very thick, and it swims edgeways. It is of a blackish colour, a little tinged with red; it has no scales, but the skin is rough, with sharp tubercles of a blackish colour in every part. There are three rows of crooked spines or prickles on each side; and another row of the same on the top of the back. The belly is of a bright crimson colour; the pectoral fins are large and broad, almost uniting at their base. Beneath this is the part by which it adheres to rocks, &c. under the water, and this so firmly, that it is very difficult to remove it. It consists of an oval aperture, surrounded with a muscular and soft substance, edged with small appendages like threads, which concur as so many claspers. By the assistance of this part, it adheres firmly to whatever it pleases: on putting a fish of this species, just caught, into a pail of water, it fixes itself with such force to the bottom, that, on taking the fish by the tail, the whole pail may be lifted up, though it holds some gallons, and that without removing the fish from its hold. However extraordinary this may appear, we have sufficient testimony of the truth of it; for Mr. Pennant informs us, he has *known* an instance of the kind.

The mouth of the Lump-fish resembles that of the sun-fish, but is somewhat larger: the lips are flat and thick; the jaws are full of teeth, and the nostrils are tubes or pipes which rise above the skin.

These fish are found in great abundance in the Greenland seas, during the months of April and

May, when they approach the shore to spawn. They have extremely large roes, which the Greenlanders boil and eat: they are remarkably fat, which renders them more agreeable to the natives, who are fond of oily food.

NATURAL HISTORY of the SEA SNAIL.

THIS animal takes its name from the soft and unctuous texture of its body, resembling the Snail upon land; it is almost transparent, and quickly dissolves and melts away. It is but a small fish, not exceeding five inches in length. When fresh taken, the colour is of a pale brown: the shape of the body is round, and the back fin extends from the head to the tail. Beneath the throat is a round depression, of a whitish colour, surrounded by twelve broken spots, placed in a circle. The head is large, thick and round; the jaws are very rough, but are destitute of teeth: the belly is white and very protuberant. It adheres to the rocks, &c. like the other species. It is found in the sea, near the mouths of great rivers.

NATURAL HISTORY of the PIKE FISH.

THE body of this fish, in the thickest part, is not thicker than a swan's quill, when the animal is about sixteen inches long. This is angular, but as the angles are not very sharp, they are hardly discernible till the fish is dried. The general colour of this fish is an olive brown, marked with several blueish lines, pointing from the back to the belly; which, in dried fish, appear like the signs of so many joints. They are viviparous; for on crushing one immediately after it was taken, hundreds of minute young ones were perceived to crawl out.

There is another of this tribe called the shorter Pike-fish, which is shorter and thicker than the former, and is not longer than twelve inches.

The little Pike-fish, as its name implies, is very small, not exceeding five inches in length. It is very slender, and tapers off to a point.

C H A P. III.

NATURAL HISTORY of FISHES of the SPINOUS KIND, viz. the EEL, the SEA-WOLF, the LAUNCE, the SWORD-FISH, the DRAGON-FISH, the WEAVER, the COD, the TORSK, the HADDOCK, the WHITING, the BIB, the POOR, the COAL-FISH, the POLLACK, the HAKE, the LING, the BURBOT, the SEA-LEACH, the BLENNY, the SEA-GUDGEON, the BULL-HEAD, the POGGE, the FATHER-LASHER, the DOREE, the HOLLIBUT, the PLAICE, the DAB, the FLOUNDER, the SOLE, and the TURBOT.

OF SPINOUS FISHES.

THESE are obviously distinguished from the rest by having a complete bony covering to their gills; by their being furnished with no other method of breathing than with gills only; by their bones, which are sharp and thorny; and their tails, which are placed in a situation perpendicular to the body. This is that class which alone our later naturalists are willing to admit as fishes. The cetaceous class with them are but beasts that have taken up their abode in the ocean; the cartilaginous class are an amphibious band, that are but half denizens of that element: according to

the moderns, it is Fishes of the Spinous kind that really deserve the appellation.

The generality of mankind will hardly allow this distinction; but whatever be the justice of this preference in favour of the Spinous class, it is certain that the cetaceous and cartilaginous classes bear no proportion to them in number. Of the Spinous classes, above four hundred species are already known; the numbers of the former are therefore trifling in comparison, and not above a fifth part of the finny creation.

From the infinite variety in this class, it is obvious how difficult a task it must have been to describe or remember even a part of what it contains. When

six hundred different sorts of animals offer themselves to consideration, the mind is bewildered in the multiplicity of objects that all lay some claim to its attention. To obviate this confusion, systems have been devised, which, throwing several Fishes that agree in many particulars into one groupe, and thus uniting all into so many particular bodies, the mind that was incapable of separately considering each, is enabled to comprehend all when thus offered in larger masses to its consideration.

Of all the beings in animated nature, Fishes seem most to demand a systematical arrangement. Quadrupeds are but few, and can be all known; birds, from their seldom varying in their size, can be very tolerably distinguished without system; but among Fishes, which no size can discriminate, where the animal of ten inches, and that of ten feet, is entirely the same, there must be some other criterion by which they are to be distinguished; something that gives precision to our ideas of the animal whose history we desire to know.

Very little is yet known of the real history of Fishes; but of a great many we have full and sufficient accounts, as to their external form. It would be unpardonable, therefore, in an history of these animals, not to give what we do know; and at least arrange our forces, though we cannot tell their destination. In this art of arrangement, Artedi and Linnæus have long been conspicuous: they have both taken a view of the animal's form in different lights; and from the parts which most struck them, have founded their respective systems.

Artedi, who was the foremost of the two, perceiving that some Fishes had hard prickly fins, as the pike; that others had soft pliant ones, as the herring; and that others still were destitute of that particular fin, by which the gills are opened and shut, as the eel, made out a system from these varieties. Linnæus, on the other hand, rejecting this system, which he found liable to too many exceptions, considered the fins, not with regard to their substance, but their position. The ventral fins seem to be the great object of his system; he considers them in fishes supplying the same offices as feet in quadrupeds; and from their total absence, or from their being situated nearer the head or the tail, in different Fishes, he takes the differences of his system.

These arrangements, which are in a great degree arbitrary, and which are rather a method than a science, are always fluctuating; and the last is generally preferred to the preceding. There has lately appeared, however, a system composed by Mr. Gouan, of Montpellier, that deserves approbation for more than its novelty. It appears the best arrangement of this kind that ever was made; in which the divisions are not only precisely systematical, but in some measure adopted by nature itself. This learned Frenchman has united the systems of Artedi and Linnæus together; and by bringing one to correct the other, has made out a number of tribes, that are marked with the utmost precision. A part of this system, however, we have already gone through in the cartilaginous. In the arrangement of these we have followed Linnæus, as the number of them was but small, and his method simple. But in that which is more properly called the Spinous class of Fishes, we shall principally follow Mr. Gouan's system; the terms of which, as well as of all the former systems, require some explanation. We do not love to multiply the technical terms of a science; but it often happens, that names, by being long used, are as necessary to be known as the science itself.

If we pay due attention to the substance of the fin of a Fish, we shall find it composed, besides the skin, either of straight, hard, pointed, bony prickles, or spines, as in the pike; or of soft, crooked or forked

bones, or cartilages, as in the herring. The Fish that have bony prickly fins, are called prickly finned Fish; the latter, that have soft or cartilaginous fins, are called soft finned Fish. The prickly finned Fish have received the Greek new-formed name of *acanthopterygii*; the soft finned Fish have likewise their barbarous Greek name of *malacopterygii*. Thus far Artedi has supplied Mr. Gouan with names and divisions. All Spinous Fish are divided into prickly finned Fish, and soft finned Fish.

Linnæus, indeed, has taught him to remark the situation of the fins: for the ventral or belly fins, which are those particularly to be remarked, are either wholly wanting, as in the eel, and then the Fish is called *apodal* (a Greek word, signifying without feet;) or the ventral fins are placed more forward than the pectoral fins, as in the haddock, and then the animal is called a *jugular* Fish; or the ventral fins are placed directly under the pectoral fins, as in the father-lasher, and then it is called a *thoracic* Fish: or, lastly, the ventral fins are placed nearer the tail than the pectoral fins, as in the minnow, and then it is an *abdominal* Fish.

The French naturalist then mixes and unites these distributions into two grand divisions. All the prickly finned Fish make one general division; all the soft finned Fish another. These first are distinguished from each other, as being either *apodal*, *jugular*, *thoracic* or *abdominal*. Thus there are prickly finned *apodal* Fishes, prickly finned *jugular* Fishes, prickly finned *thoracic* Fishes, and prickly finned *abdominal* Fishes. On the other hand, the soft finned Fishes fall under a similar distribution, and make the other general division. Thus there are soft finned *apodal* Fishes, soft finned *jugular* Fishes, soft finned *thoracic* Fishes, and soft finned *abdominal* Fishes. These general characters are strongly marked, and easily remembered. It only remains, therefore, to divide these into such tribes as are most strongly marked by nature; and to give the distinct characters of each, to form a complete system with great simplicity. This Mr. Gouan has done; and the reader, who can contain in his memory the characteristic marks of these, will have a tolerable idea of the form of every kind of Spinous Fish: but as to the history and nature of the animal, itself, that can only be obtained by information and experience.

Having mentioned a method by which Spinous Fishes may be distinguished from each other, the history of each in particular will naturally follow: the history of any one of this class, indeed, very much resembles that of all the rest: they breathe air and water through the gills; they live by rapine; each devouring such animals as its mouth is capable of admitting; and they propagate, not by bringing forth their young alive, as in the cetaceous tribes, nor by distinct eggs, as in the generality of the cartilaginous tribes, but by spawn, or peas, as they are generally called, which they produce by hundreds of thousands. These are the leading marks that run through their whole history, and which have so much swelled books with tiresome repetition.

We shall carefully draw this numerous class into one point of view, and mark how they differ from the former classes; and what they possess peculiarly striking, so as to distinguish them from each other: the first object that presents itself, and that by which they differ from all others, are the bones. These, when examined but slightly, appear to be entirely solid; yet, when viewed more closely, every bone will be found hollow, and filled with a substance less rancid and oily than marrow. These bones are very numerous and pointed; and, as in quadrupeds, are the props or stays to which the muscles are fixed, which move the different parts of the body.

In all Spinous Fishes of the same kind, the number of bones is always the same. It is a vulgar ob-

servation

servation, that fishes are at some seasons more bony than at others; indeed this scarce requires contradiction. It is however true, that fish are at some seasons much fatter than at others; so that the quantity of the flesh being diminished, and that of the bones remaining the same, they appear to increase in number, as they actually bear a greater proportion.

It has been already observed, that all fish of the same kind, have the same number of bones: the skeleton of a fish, however irregularly the bones may fall in our way at table, has its members very regularly disposed; and every bone has its fixed place, with as much precision as we find in the orders of a regular fabric. But then, Spinous Fish differ in the number of bones according to the species; for some have a greater number of fins, by which they move in the water. The number in each is always in proportion to the number and size of these fins: for every fish has a regular apparatus of bones and muscles, by which the fins are moved; and all those fish where they are numerous or large, must consequently be considerably bony. Indeed in the larger fish, the quantity of flesh is so much, and the bones themselves are so large, that they are easily seen and separated: but in the smaller kinds with many fins, the bones are as numerous as in the great; yet being so very minute, they lurk almost in every part of the flesh, and are dangerous as well as troublesome to be eaten. In a word, those fish which are large, fat, and have few fins, are found to be the least bony; those which are small, lean, and have many fins, are the most bony of all others. Thus, for instance, a roach appears more bony than a carp, because it is leaner and smaller; and it is actually more bony than an eel, because it has a greater number of fins.

The Spinous Fish, as they partake less of the quadrupede in their formation than any others, so they can bear to live out of their own element a shorter time. In general, when taken out of the water, they testify their change by panting more violently and at closer intervals; the thin air not furnishing their gills the proper play; and in a few minutes they expire. Some indeed are more vivacious in air than others; the eel will live several hours out of water; and the carp has been known to be fattened in a damp cellar.

The method is by placing it in a net well wrapped up in wet moss, the mouth only out, and then hung up in a vault. The fish is fed with white bread and milk; and the net sometimes plunged into the water. The animal, thus managed, has been known not only to live for a fortnight, but to grow exceedingly fat, and of a superior flavour: from this it appears, that the want of moisture in the gills, is the chief cause of the death of these animals; and could that be supplied, their lives might be prolonged in the air, almost as well as in their own element.

It is, however, impossible to account for the different operations of the same element, upon animals that, to appearance, have the same conformation. To some fishes, bred in the sea, fresh water is immediate destruction: on the other hand, some fishes, that live in our lakes and ponds, cannot endure the salt water. Whence this difference can arise, is not easily accounted for. The saline quality of the water cannot properly be given as the cause; since no fishes imbibe any of the sea's saltiness with their food, or in respiration. The flesh of all fishes is equally fresh, both in the river, and at the saltiest depths of the ocean; the salt of the element in which they live, not in the least mixing with their constitution. Whence then is it, that animals will live only there, and will quickly expire, when carried into fresh water? It may pro-

bably arise from the superior weight of the sea water. As from the great quantity of salt dissolved in its composition, it is much heavier than fresh water, so it is probable it lies with greater force upon the organs of the respiration, and gives them their proper and necessary play: on the other hand, those fish which are used only to fresh water, cannot bear the weight of the saline fluid, and expire in a manner suffocated in the grossness of the strange element.

Thus it is evident, that there are some tribes that live only in the sea, and others only in fresh water, yet there are some whose organs are equally adapted to either element; and that spend a part of the time allotted them by nature in one, and a part in the other. Thus the salmon, the shad, the smelt, and the flounder, annually quit their native ocean, and visit our rivers to deposit their spawn. This seems the most important business of their lives; and there is no danger which they will not encounter, even to the surmounting precipices, to find a proper place for the deposition of their future offspring. The salmon, upon these occasions, is known to ascend rivers five hundred miles from the sea; and to brave not only the danger of various enemies, but also to spring up cataracts as high as a house. As soon as they come to the bottom of the torrent, they seem disappointed to meet the obstruction, and swim some paces back: they then take a view of the danger that lies before them, survey it motionless for some minutes, advance, and again retreat; till at last, summoning up all their force, they take a leap from the bottom, their body straight, and strongly in motion; and thus most frequently clear every obstruction. Sometimes indeed it happens, that they have not sufficient strength to make the leap; and then, in our fisheries, they are taken in their descent. But this is one of the smallest dangers that attend these adventuring animals in their progress: numberless are the methods of taking them; as well by the hook, as by nets, baskets, and other inventions. Their capture makes, in several countries, a great article of commerce; as being cured in several different manners, either by salting, pickling, or drying, they are sent to all the markets of Europe. They are indeed either fresh, dried, or pickled, very excellent food, and immense quantities of them are annually consumed.

NATURAL HISTORY of the EEL.

THIS is a very singular fish in many things that relate to its natural history, and in some respects borders on the nature of the reptile tribe. During the night it will quit its element to wander along the meadows; not only for the change of habitation, but also for the sake of prey, feeding on the snails which it discovers in its passage.

In winter it sinks deep into the mud, and continues in a state of rest like the serpent kind. Morton, in his history of Northamptonshire, informs us, that in the river Nyne there is a species of small Eel, with a smaller head and a larger mouth than the common kind, which is called the *bed-eel*, and is found in clusters at the bottom of the river.

The ancients adopted extravagant notions about the generation of these fish; supposing they were either created from the mud, or that the scrapings of their bodies, which they left on the stones, were animated and became young Eels. Some moderns have given into these, and other equally wild opinions. The appearance of Eels, in ponds that were never stocked with them, they knew not how to account for; especially when they were so remote, as to make their being met with in such places a phenomenon. It is however extremely probable, that many

many waters are supplied with these fish by the aquatic fowl of prey; in the same manner as vegetation is spread by many of the land birds, by dropping seeds as they carry them to feed their young; and such may be the occasion of the appearance of Eels in places where they were never seen before. With respect to the immediate generation of these fish, it has been sufficiently proved to be effected in the usual course of nature, and that they are viviparous. They will live out of water longer than any fish, and are extremely tenacious of life, as their parts will move a considerable time after they are cut in pieces.

The Eel is extremely voracious, and very destructive to the fry of fish.

The eyes of the Eel are placed at a small distance from the end of the nose: the iris of the eye is tinged with red; the teeth are small, sharp, and numerous: the under jaw is longer than the upper: beneath each eye is a minute orifice; and at the end of the nose two others, which are small and tubular. The Eel has a pair of pectoral fins, rounded at their ends; it has also a narrow fin on the back, uniting with that of the tail; and the anal fin joins in the same manner beneath. The orifice to the gills is behind the pectoral fin.

Eels differ in their colours, from a sooty hue to a light olive green: those which are called silver Eels, have white bellies, and a remarkable clearness throughout.

There is a variety of this fish, known in the Thames by the name of Grigs, and about Oxford by that of Grigs or Gluts. They have a larger head, a blunter nose, and a thicker skin than the common sort: neither are they so fat, or so much esteemed; nor do they often exceed three pounds in weight.

Common Eels sometimes grow so large as to weigh upwards of twenty pounds, but that is extremely rare. The Eel is the most universal of fish, and yet it is hardly ever found in the Danube, tho' it is very common in the lakes and rivers of Upper Austria. Tho' the Romans held these fish very cheap, the luxurious Syberites were so fond of them, as to exempt the persons who sold them from every kind of tribute.

Those which are found in rivers, or other clear running waters, are the best; as to their size it is immaterial: the liver and the gall are extremely acrid. Boerhaave says, that no fishes have a more acrid gall; and that with a mixture of the galls of the Eel and the pike, made into pills, he hath cured many ricketty children with hard and swelled bellies. The Torporific Eel, found in Guiana, in South America, if caught by a hook, violently shocks the person who holds the line: the same Eel touched with an iron rod, held in the hand of a person whose other hand is joined to another, &c. communicates a violent shock to ten or twelve persons thus joining hands, in a manner exactly similar to that of the electric machine. No shock is perceived by the holding the hand in the water near the fish when it is neither displeased nor touched; but if it is angry, it can give a shock to a person at five or six inches distance. This shock is produced by an emission of electric particles, which the fish discharges at pleasure. On the death of the animal no such electric property remains, and then the Indians eat it.

The Eel is a fresh water fish; sometimes it is found in the sea; not that it is produced there, but because it goes often out of rivers into the sea, and so back again into rivers; it delights in pure and running waters; and they assure us it grows lean, poor, and dies at last, when confined to muddy water. It requires also a great deal of water, for otherwise it dies. It is said it

cannot bear any considerable difference of living; for in case it should in summer time be conveyed into a much colder water than that wherein it was before, it is soon destroyed. In the mean time, they say, it can live out of the water five or six days, provided the north wind blows at that time: it feeds upon roots, herbs, fish, insects, and any thing it can find in the bottom of rivers. Athenæus says, he had seen Eels in a certain country, which were so far tamed, that if they offered them any thing to eat, they would come and take it out of the person's hands. This fish lives commonly seven or eight years.

The Eel is good aliment, and much used; it is tender, soft, and nourishing, because it contains many oily and balsamic parts: it has also a great many that are dull, viscous, and gross, which make the Eel hard of digestion. They eat Eels either roasted or boiled: those that are roasted seem to be more wholesome than the other; and the reason is, because they are thereby the more digested of their viscous phlegm, than by the other way. They should also be well seasoned, and you should drink good wine upon them, in order to help the digesting of their phlegm in the stomach. The fat of an Eel is looked upon to be good to take away the signs of the small-pox in the face, to cure the piles, and to make the hair grow: it is also put into the ears to help hearing. They make a kind of mucilage of Eel's skin, by steeping and boiling it in water, which is applied to swellings, in order to the softening and dissolving of them; it is good for hernia's. *Lemery on Foods.*

The CONGER, or CONGER EEL.

This fish grows to an enormous size. Dr. Borlase assures us, that they are sometimes taken near Mount Bay of one hundred pounds weight: and we have been informed, that some have been taken near Scarborough, which were ten feet and an half in length, and eighteen inches in circumference in the thickest part. The shape of the Conger Eel is somewhat like that of the common Eel; but they differ from it in the following particulars: their colour is darker, their eyes are much larger in proportion, and the iris is of a silver colour. On each side it has a straight white broadish line, extending from the head to the tail, which seems composed of a double row of points. The fin placed on the body has its upper edge blackish throughout the whole length. The Conger has more bones than the common Eel; and the end of the snout or upper chap is furnished with two short horns or tubes, from which a liquor may be squeezed out; but this is not to be depended upon, being sometimes found in both kinds, and sometimes entirely wanting in both kinds.

Though a sea fish, it is supposed they generate like the fresh water species: innumerable quantities of what are supposed to be their fry, come up the Severn about the month of April, preceding the shads, which it is supposed migrate into that river to feed on them. Congers are extremely voracious fish, preying upon other fish. They, as well as other Eels in general, are remarkably fond of carcasses of any kind, and are frequently found lodged in those that have been accidentally taken up. Congers are an article of commerce in Cornwall; great quantities being taken on that coast, and exported to Spain and Portugal.

Fishermen are much afraid of a large Conger, lest it should endanger their legs by clinging round them; therefore they kill them as soon as possible, by striking them on the navel.

In curing them, they are slit, and hung on a frame to dry; having a vast quantity of fat, which it is necessary should exude before they are fit for use.

use. It is said, that a Conger of an hundred weight will waste by drying to twenty-four pounds.

The SAND EEL, or LAUNCE.

It resembles the common Eel in shape, being long and round, but it seldom exceeds nine or ten inches in length. The colour of the back is blue, varying with green; the sides and back are of a silver white. It is destitute of scales, has a sharp snout, and a wide mouth without teeth: the lower jaw is longer than the upper, and the upper jaw is moveable, and capable of being protruded; so that, when open, the gape is very wide. It has a long fin, which extends almost the whole length of the back, is very narrow, and consists of fifty-eight rays: there is also a pair of fins at the gills, but none on the belly. The iris is silvery. The tail is forked, but the lobes are rounded at their extremities.

These fish are found in most of our sandy shores, during some of the summer months: on the recess of the sides they conceal themselves about half a foot in the sand, in those places where the water is left at the depth of about a foot; and the fishermen of Cornwall, and the isle of Man, search for them with hooks provided for that purpose. They are very delicate eating, but they are generally used as baits for other fish. The female is longer and slenderer than the male.

NATURAL HISTORY of the WOLF FISH, or SEA WOLF.

THIS animal has a smooth slippery body without scales. It somewhat resembles an Eel, but is of a brownish grey, and the sides are adorned with blackish transverse shades. The head is large, and flat above the eyes, and the cheeks appear swelled and puffed out. It is a most voracious fish, and, when taken, will fasten on any thing within its reach. The fishermen, dreading its bite, endeavour to disarm it as soon as possible; they immediately pull out its fore-teeth, and then kill it by striking it behind the head. The Danish and German writers say, that its bite is so hard that it will seize on an anchor, and leave the marks of its teeth in it; and that the animal is capable of crushing even stones with its jaws. It feeds principally on crustaceous and shell fish.

They are taken in the sea near Yorkshire and Northumberland: on the Yorkshire coast they have been found of the length of four feet; and Dr. Gronovius informs us, that they have been taken near Hitland upwards of seven feet long. This fish has so disagreeable an aspect, that nobody at Scarborough, except the fishermen, will eat it, and they prefer it to holibut.

The body of the Wolf Fish is long, and a little compressed sideways, and the skin wants the lateral line: the tail is round at the end, and consists of thirteen rays: the sides, back, and fins, are of a livid lead colour, and the sides and back are marked downwards with irregular obscure dusky lines.

NATURAL HISTORY of the SWORD FISH.

THE snout of this fish is the upper jaw produced to a great length, and has a great resemblance to a sword, from whence it takes its name. They have been seen upwards of fifteen feet in length, and two hundred pounds in weight. The head is thick, the body is long and round, but grows gradually smaller towards the tail. The snout is one third of the whole length of the fish, and is compressed at the top and bottom, but sharp at the

point: the under jaw is about four times as short as the upper, and is also sharp-pointed. The mouth is destitute of teeth.

The skin of the Sword Fish is rough but very thin: the colour of the back is dusky, that of the belly a silver white. The dorsal fin begins a little above the gills, and extends almost to the tail. The tail is forked and almost in the shape of a crescent, and it has only one pair of fins at the gills.

The Sword Fish is extremely voracious, and particularly a great enemy to the tunny.

It sometimes frequents our coasts, but is much more common in the Mediterranean sea, especially in that part which separates Italy from Sicily, which has been long celebrated for it. The Sicilians, who are very fond of it, buy it up very eagerly, and, at its first coming into season, give about six-pence English per pound for it. The season for it continues from May till August. The ancients cut this fish into pieces, and salted it, whence it was called *tomus thurianus*, from *Thurii*, a town in the bay of Tarentum, famous for taking and curing it.

The ancient method of taking the Sword Fish is particularly described by Strabo, and agrees exactly with that practised at this day by the Italians and Sicilians. A man ascends one of the cliffs that overhangs the sea to observe the motions of these fish. As soon as he perceives any, he gives notice (by signs before agreed upon) of the course it takes: a fisherman, who is stationed in a boat, climbs up the mast, and on seeing the Sword Fish, directs the rowers which way to steer. When he thinks he is within reach, he immediately comes down, and strikes a spear or harpoon into its body; the handle of which being loose in the socket, separates from it, while the iron part, which is fastened to a long cord, remains in the body. The fish is then suffered to weary itself with flouncing in the water, and afterwards is drawn into the boat.

NATURAL HISTORY of the DRAGON FISH.

THE head of this fish is large and flat at the top; there are two orifices in the hind part, through which it breathes, and through which it also forces out the water it takes in at the mouth, in the same manner as the cetaceous fish. The eyes, which are large, are placed very near each other on the upper part of the head, so that in their natural position they look upwards: the pupils are of a rich sappharine blue, and the irides of a fine yellow. The upper jaw projects much farther than the lower; the mouth is very wide, and the teeth are small. It is found as far north as Spitzbergen, and as far south as the Mediterranean sea. It is also frequently seen on the Scarborough coasts. The colours are yellow, blue, and white; the fish making a beautiful appearance when it is just taken.

This species grows to the length of about ten inches: the body is slender, round, and smooth.

The SMALL DRAGON FISH.

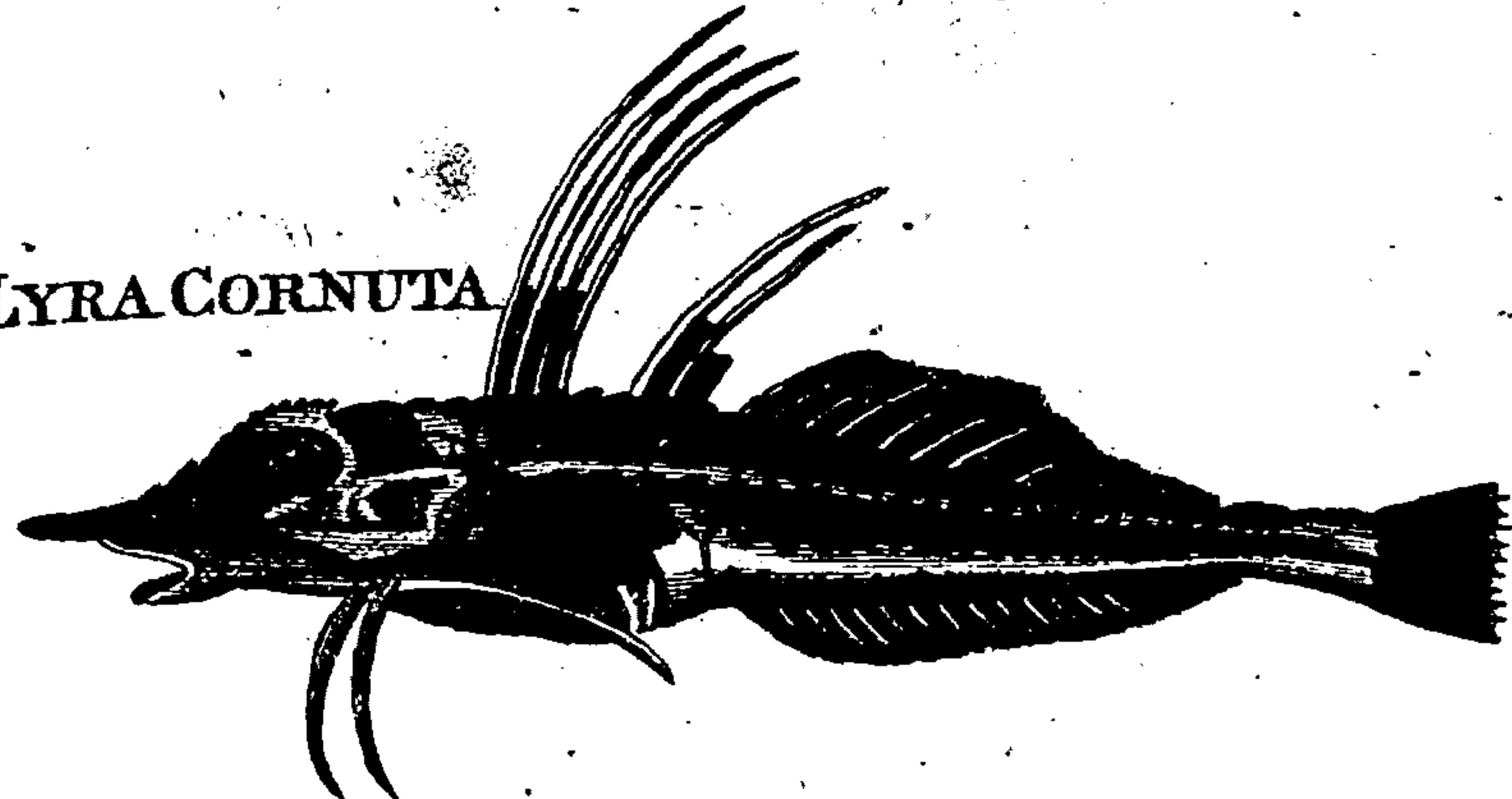
This species is of a yellowish green colour on the back, and white on the belly; the sides are speckled with small spots of a bluish silver colour. It may be distinguished from all other small fish by the spots just mentioned, by the round holes of the gills, by three-pointed prickles at the corners of the gills, by the rays of the fore back-fin rising higher than the membrane that connects them, and by the jaws being furnished with exceeding small teeth. The mouth is small, the eyes large, and almost contiguous. The Small Dragon Fish is seldom seen to exceed six or seven inches.

FISHES.

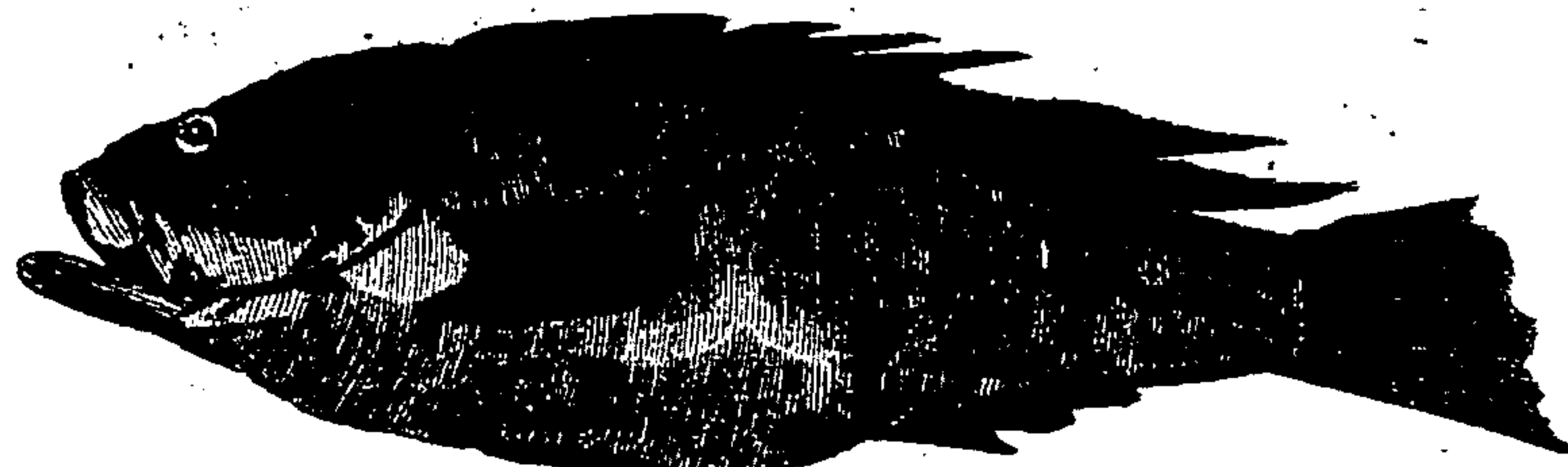
LUPUS MARINUS



LYRA CORNUTA



MEROS



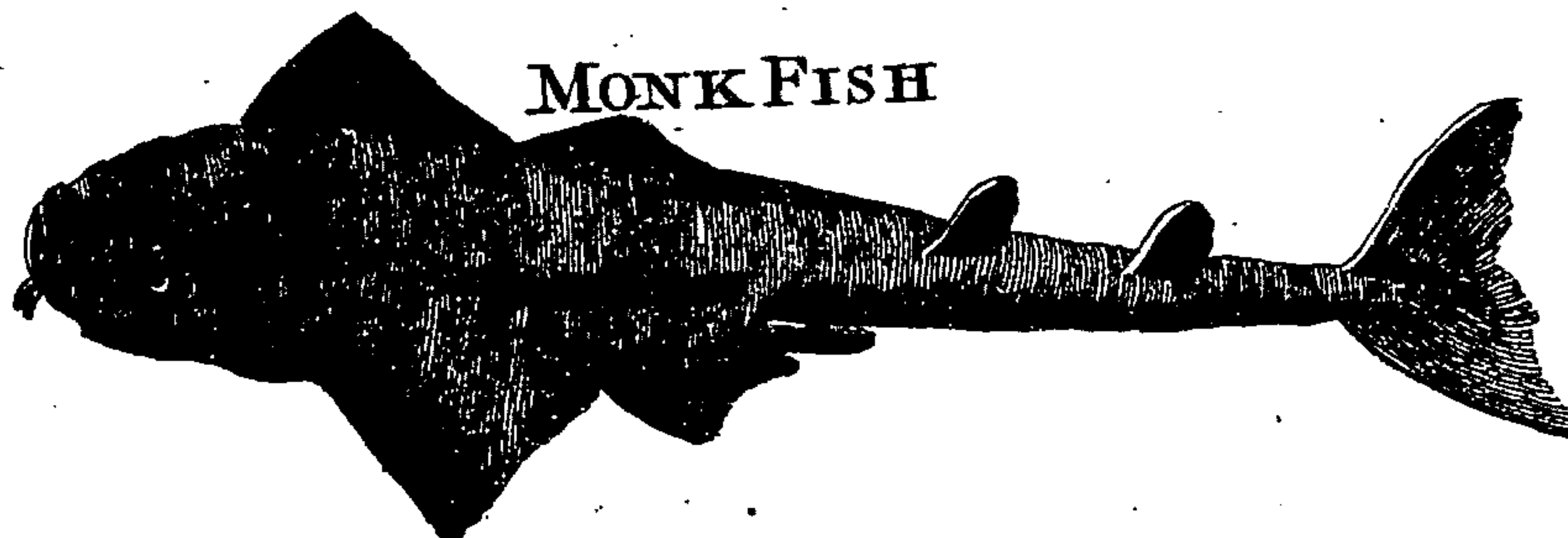
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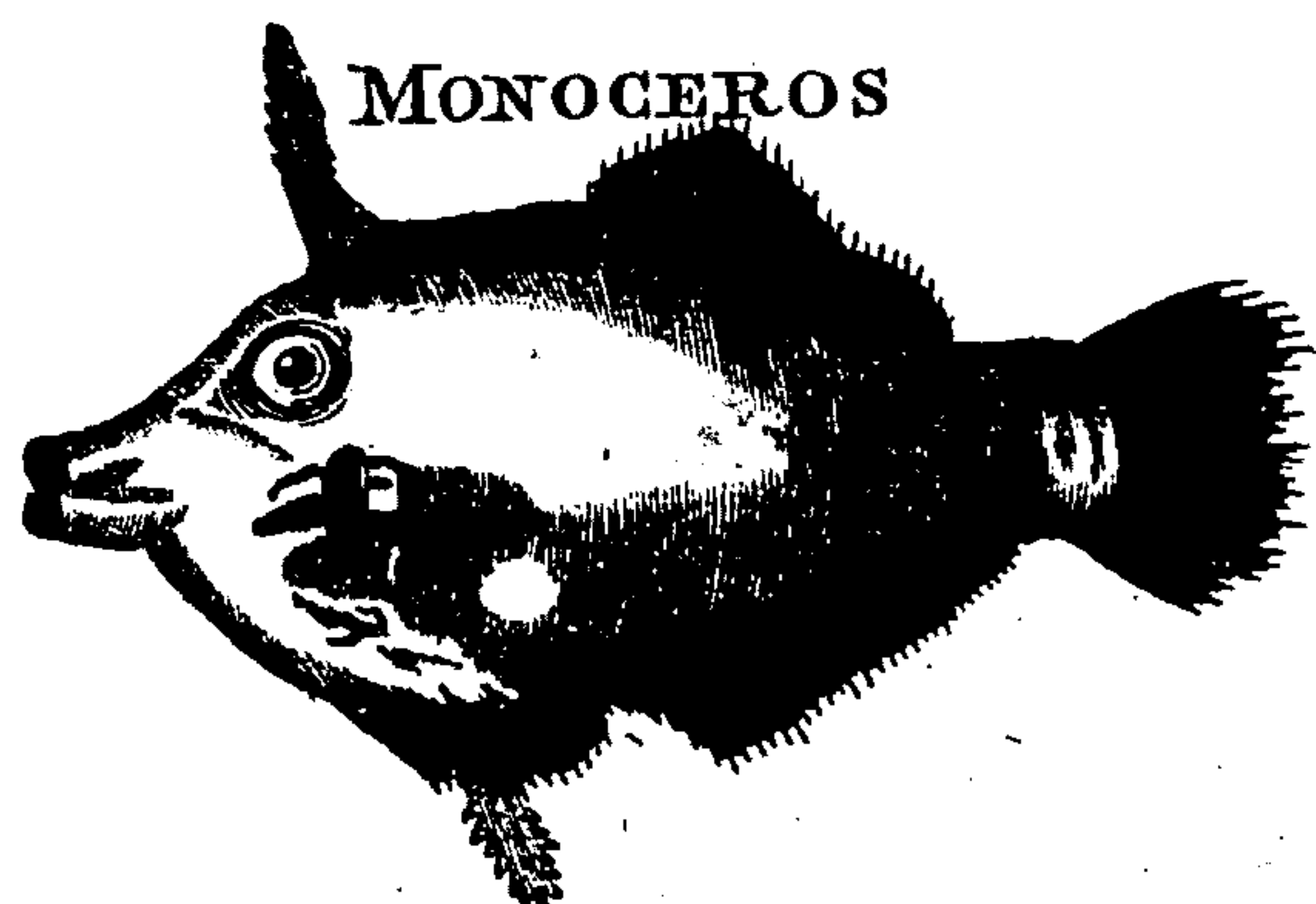
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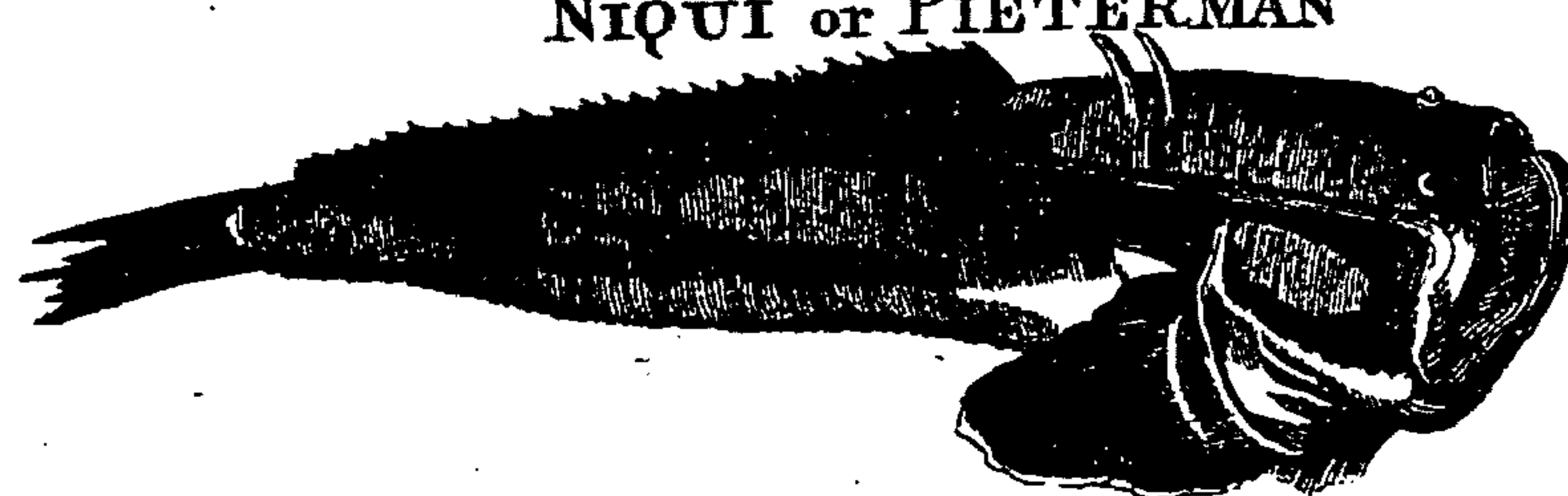
MONK FISH



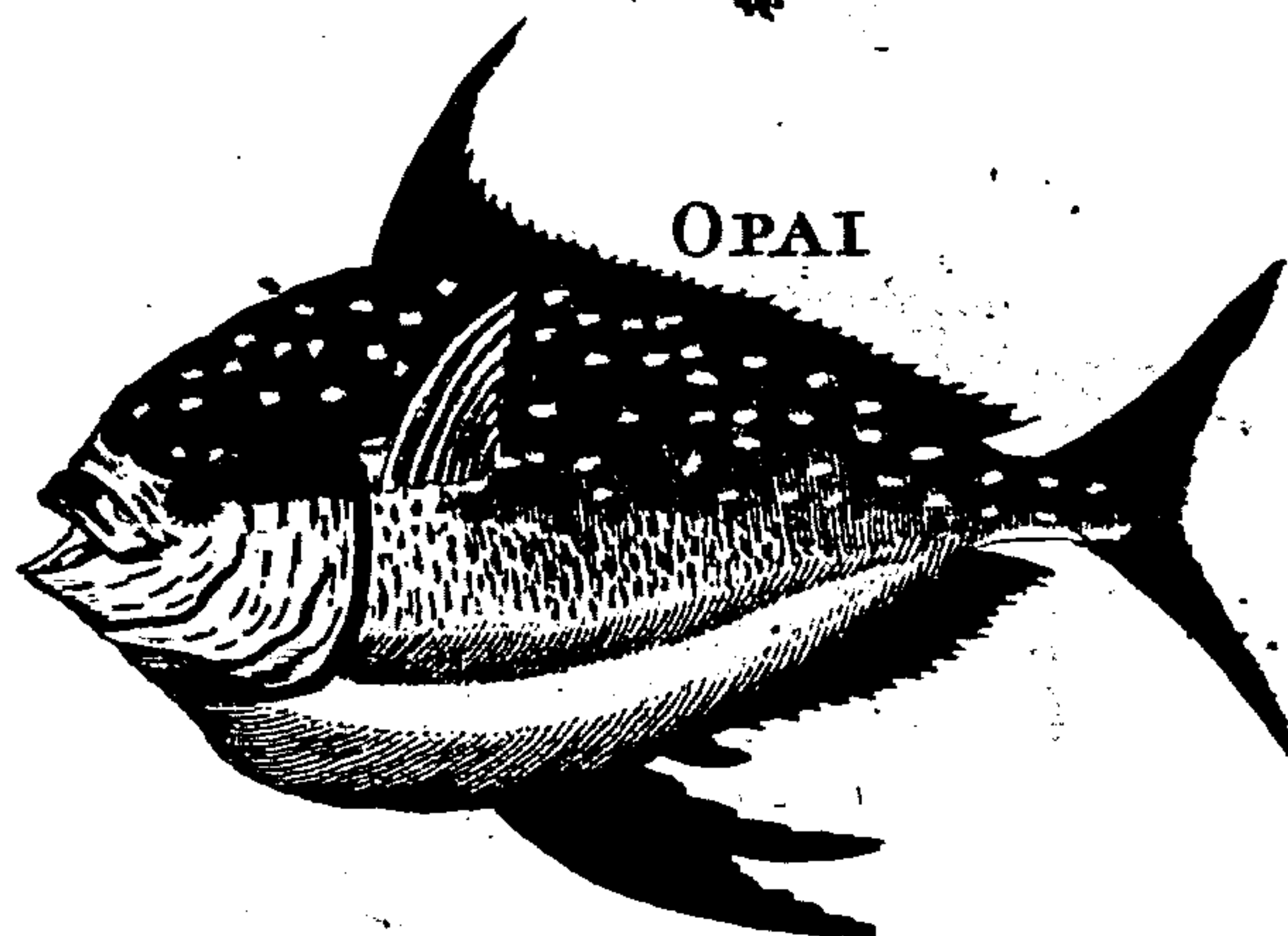
MONOCEROS



NIQUI or PIETERMAN



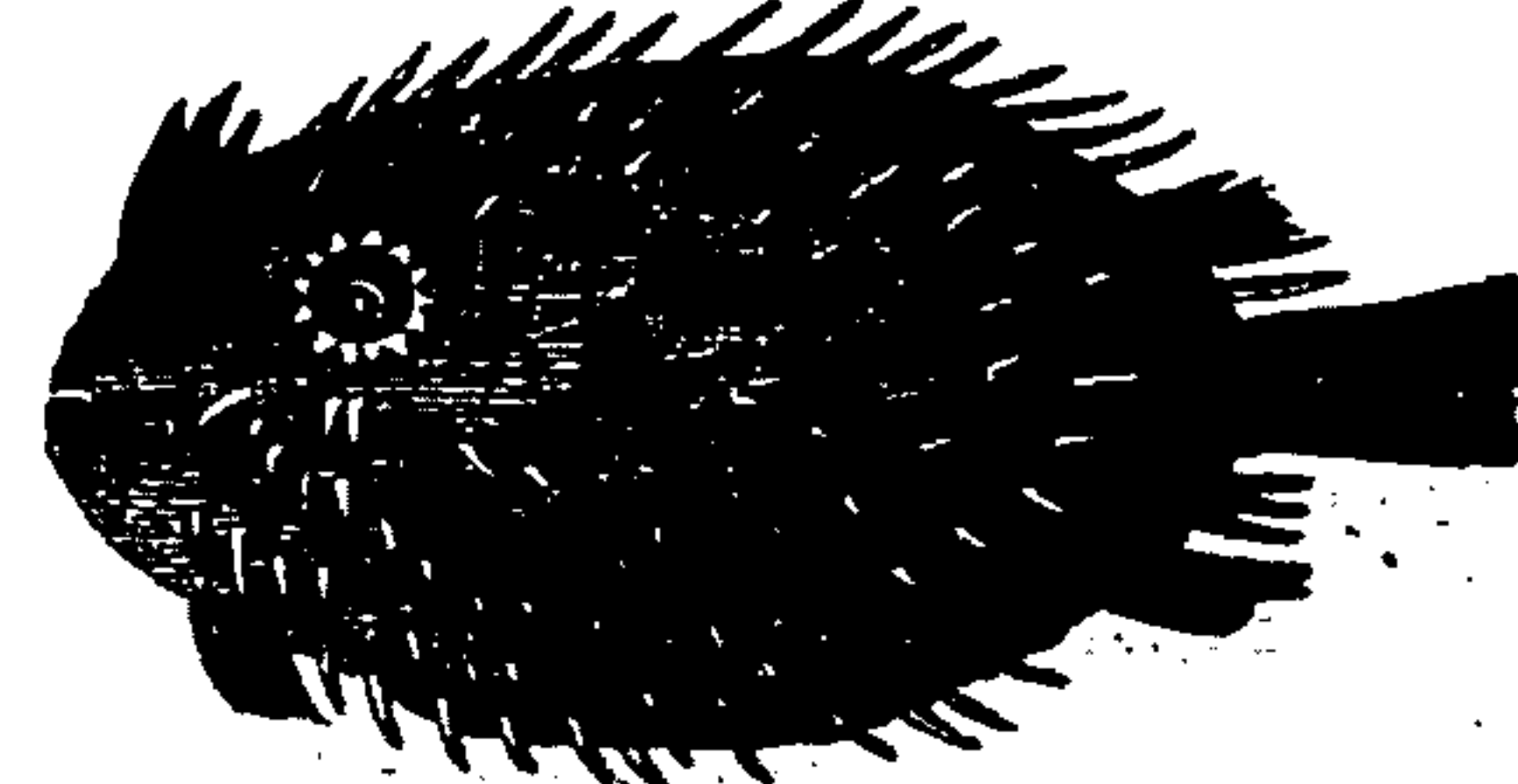
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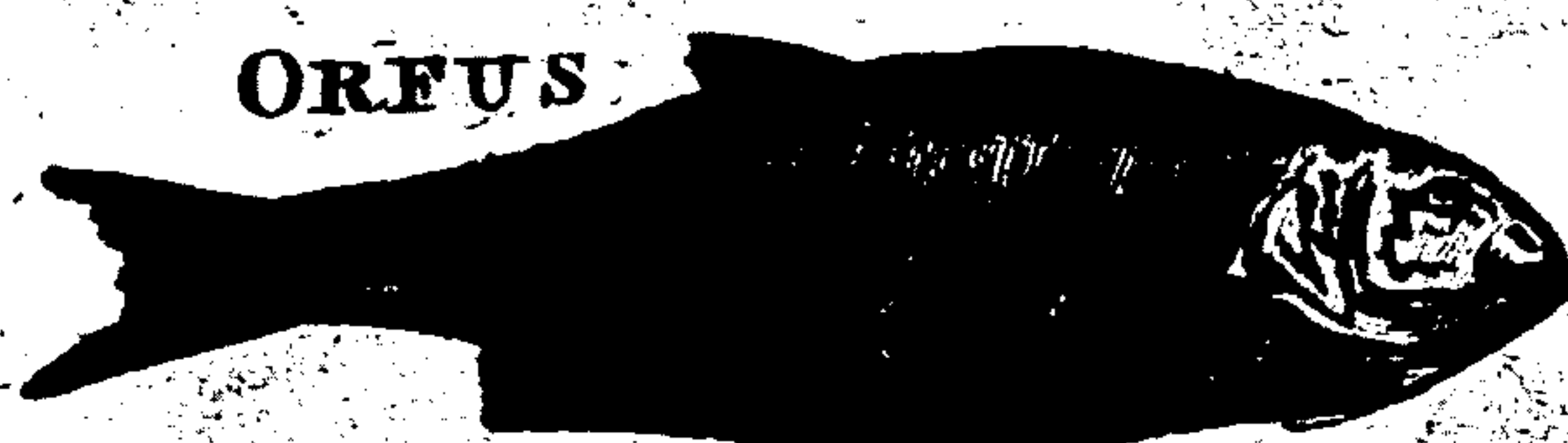
ORBIS



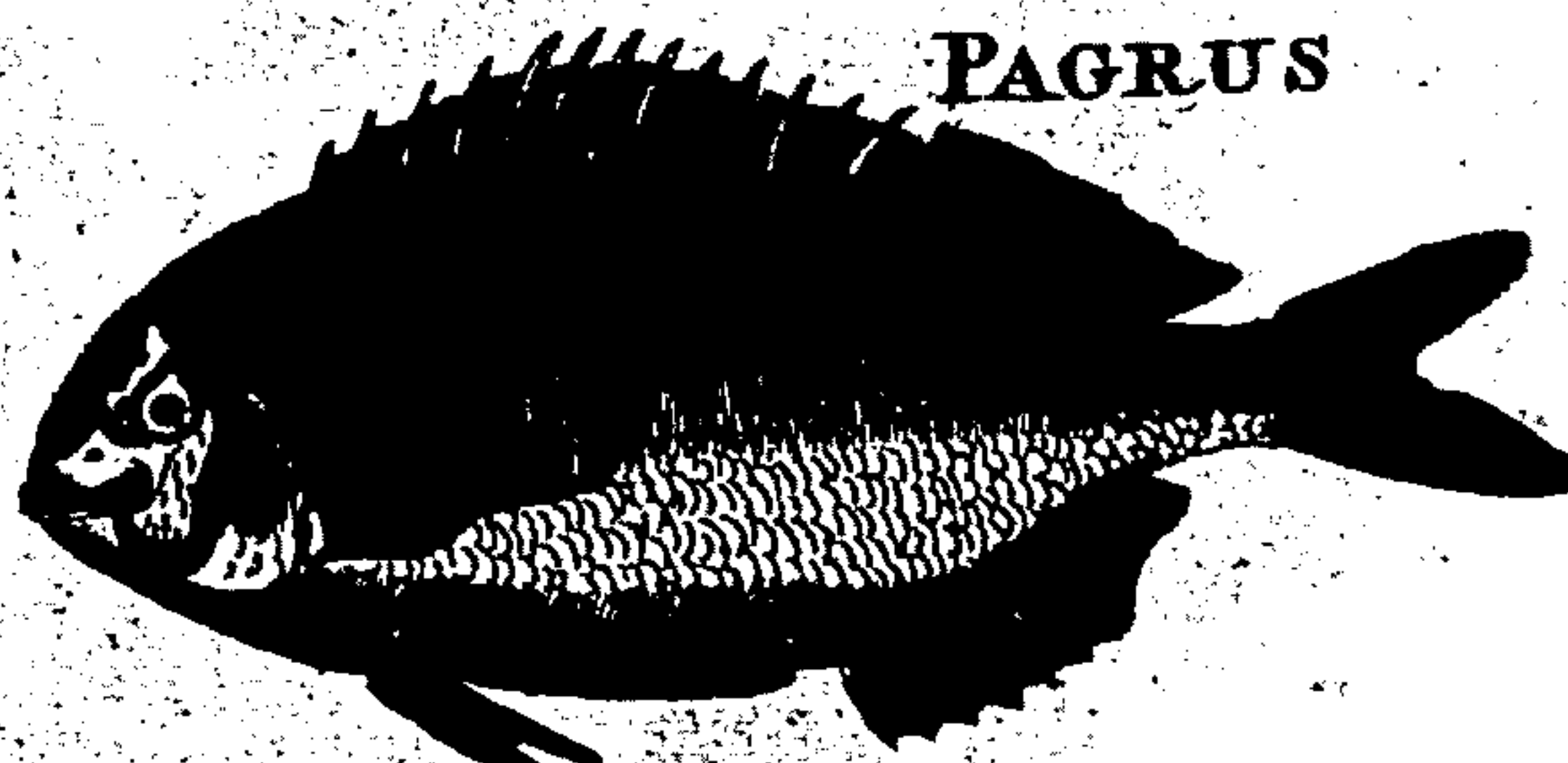
ORBIS MURIGATUS



ORFUS

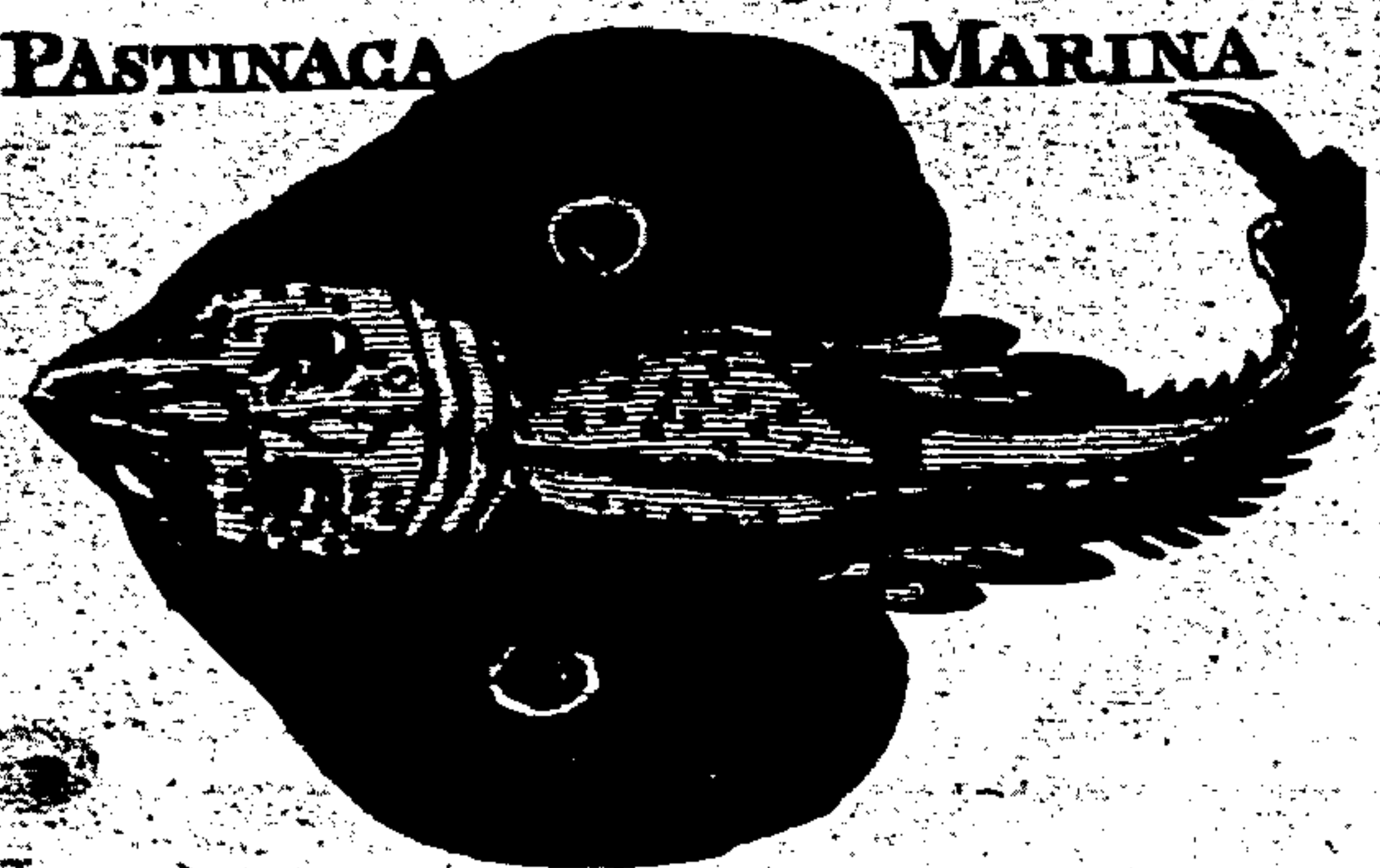


PAGRUS



PASTINACA

MARINA



PEACOCK FISH

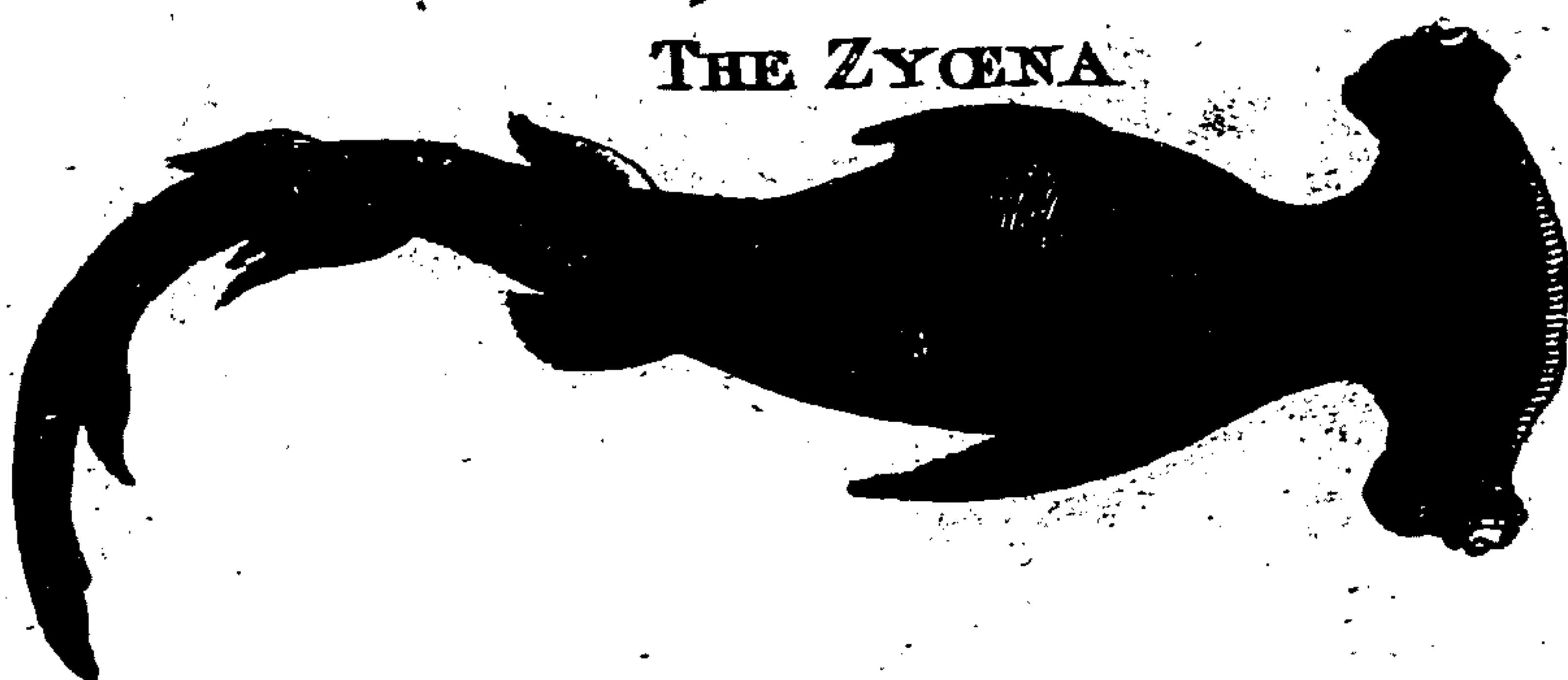


FISHES.

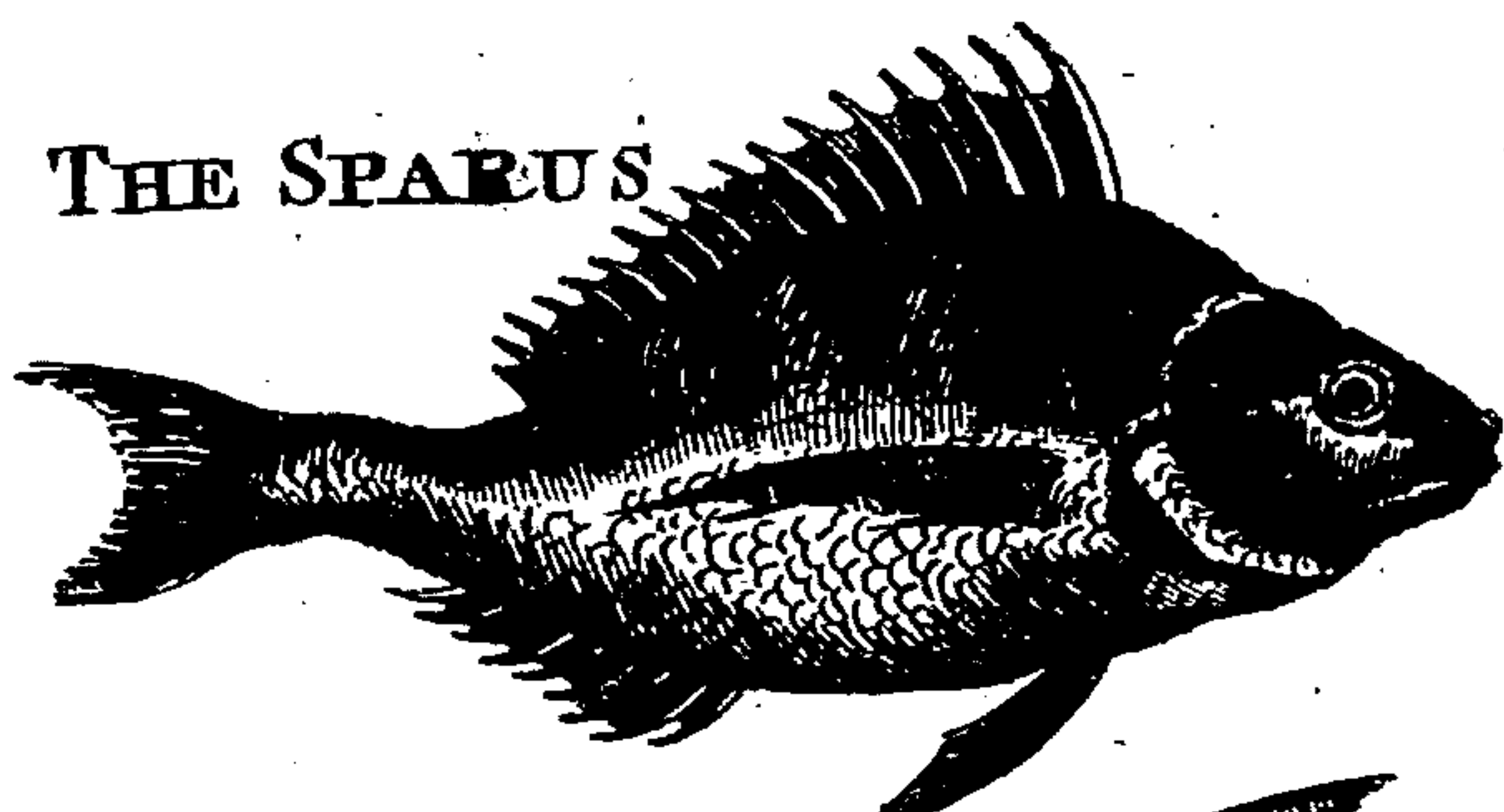
THE GATTORUGINE



THE ZYOENA



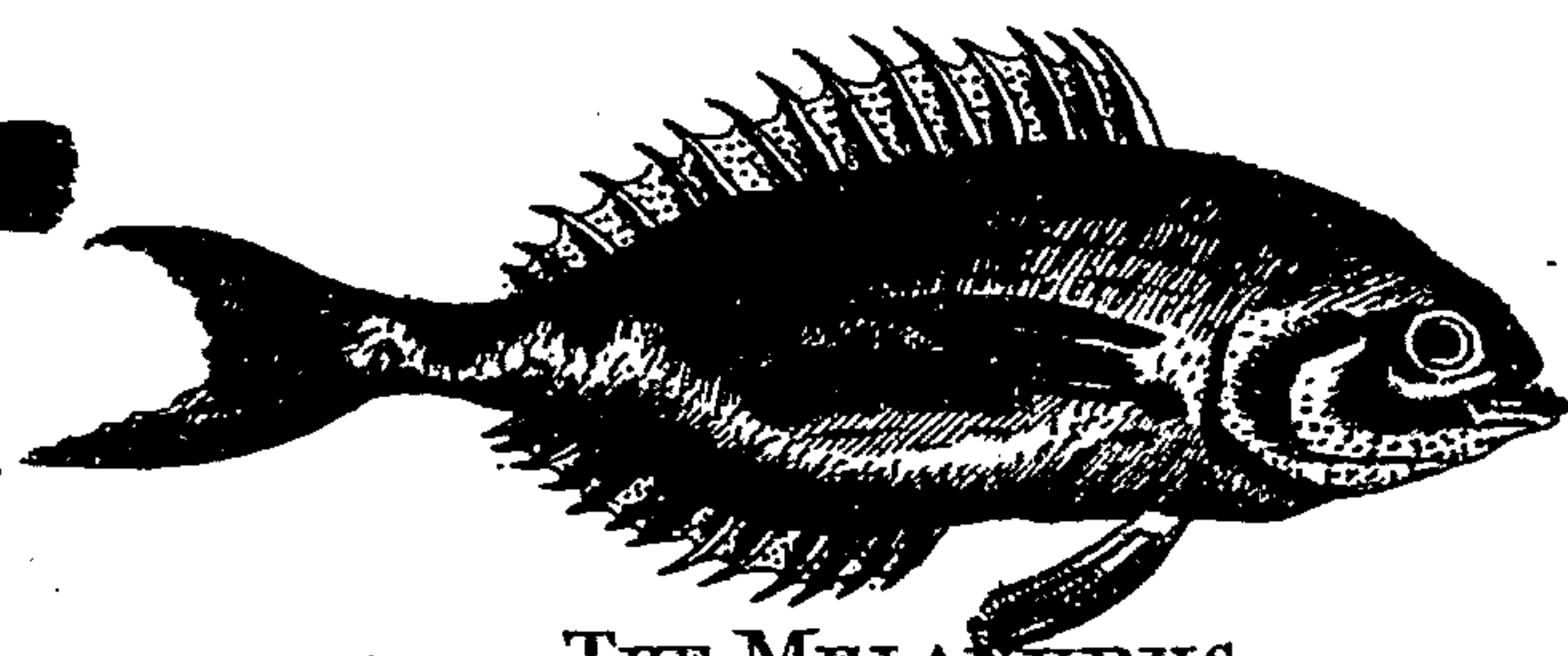
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THE PAGANELLO

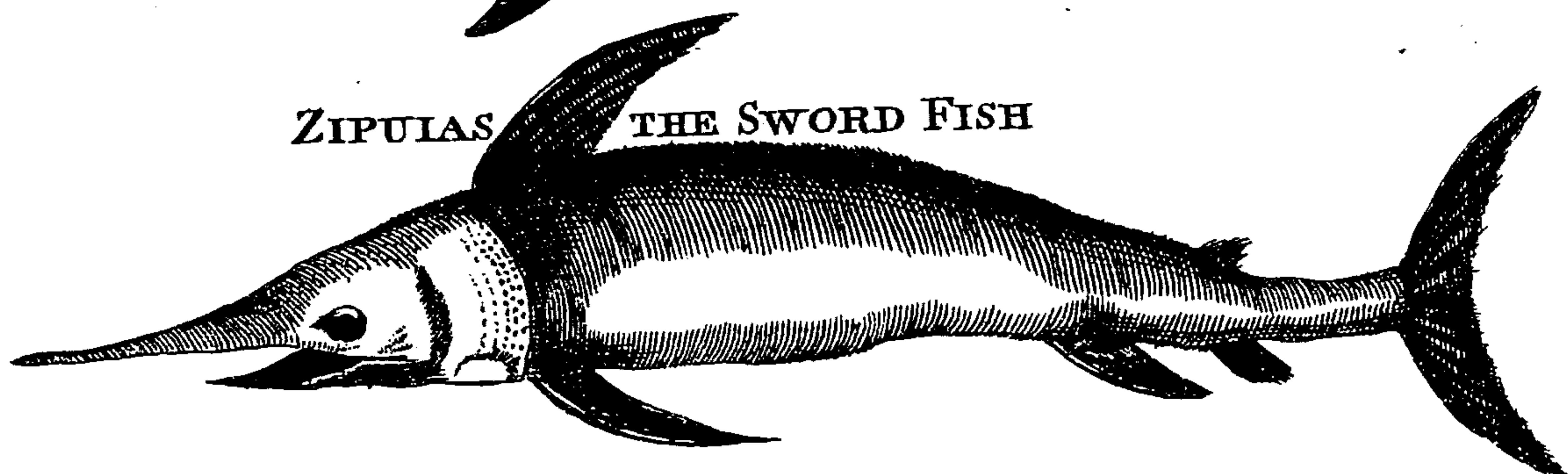


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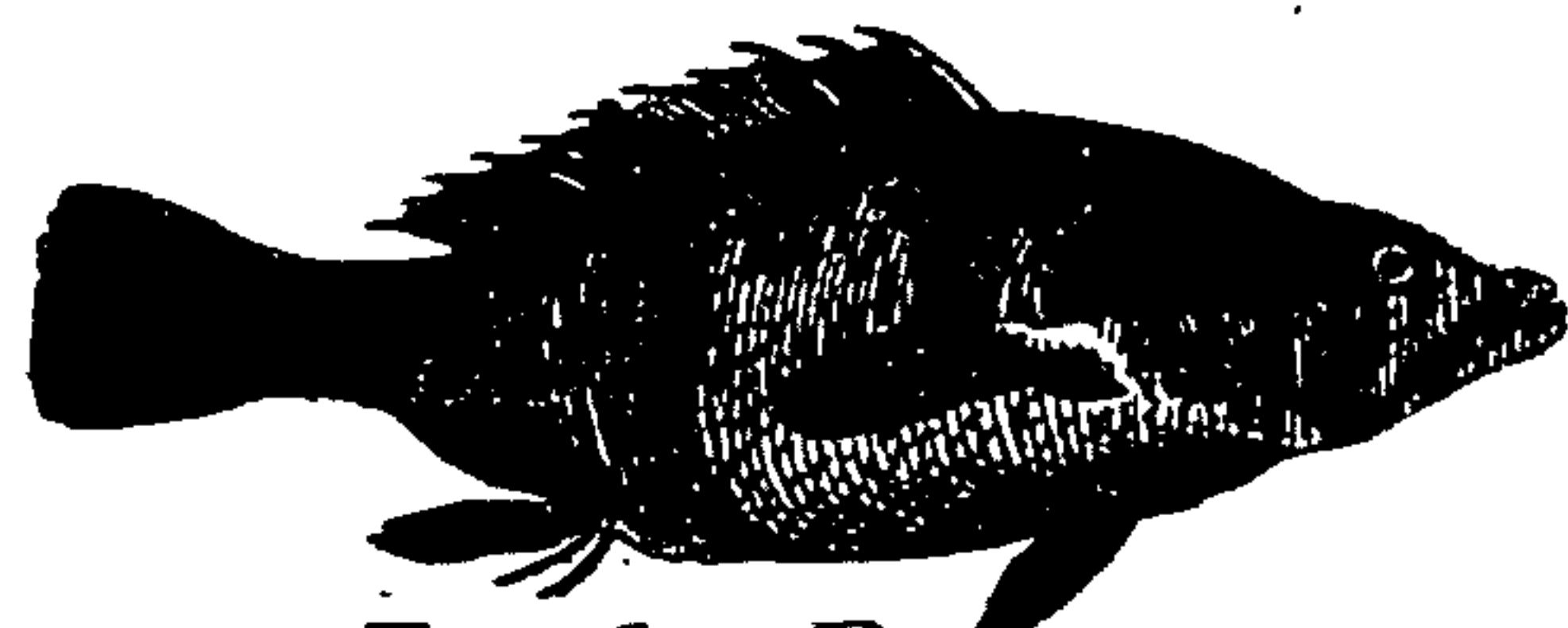


ZIPULAS

THE SWORD FISH



THE SEA PERCH



THE BULLHEAD or MILLARS THUMB



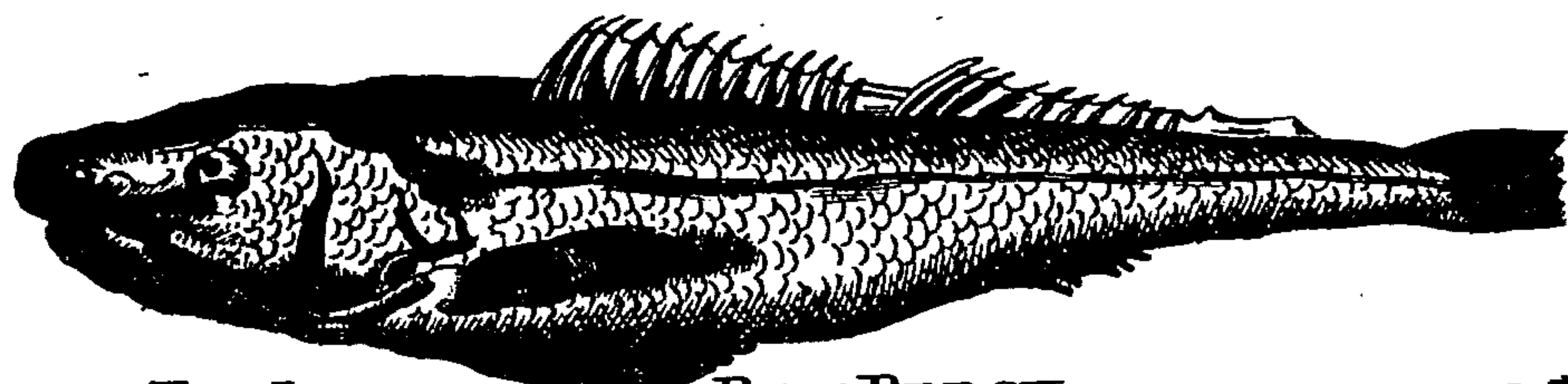
TRACHURUS THE BONITO



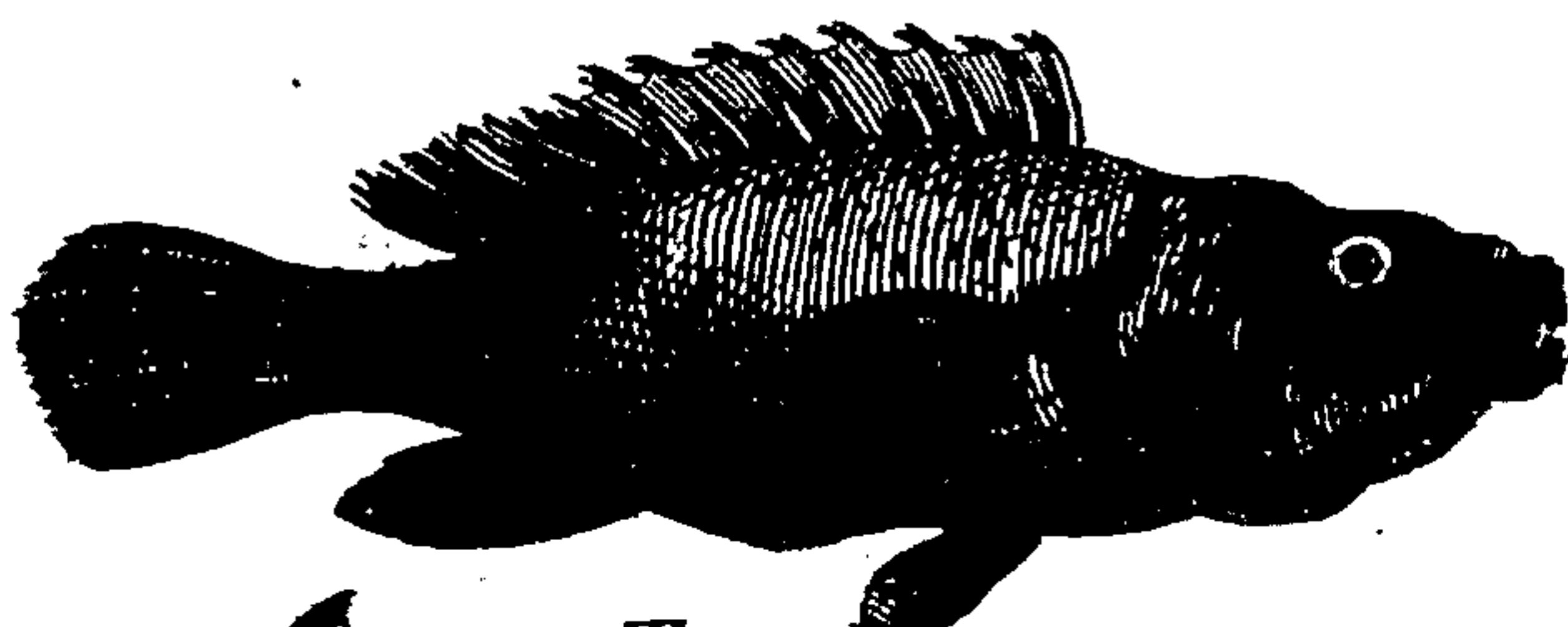
DRAEO MARINUS



THE LUCIOPEREA or PIKE PERCH



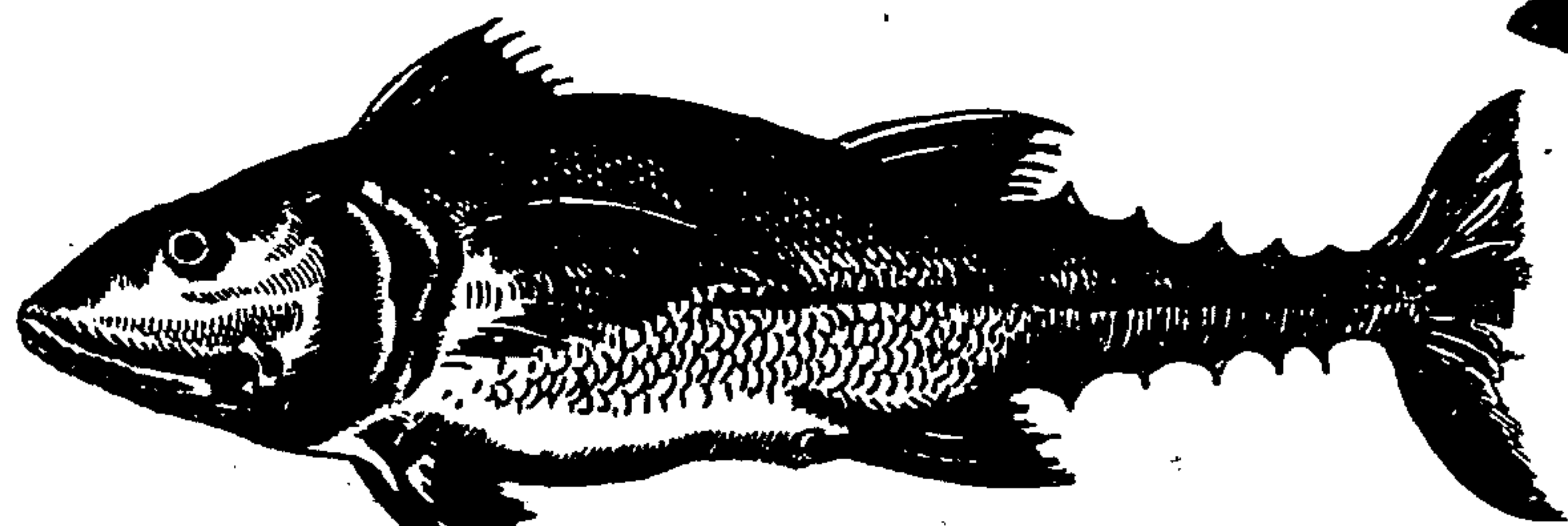
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THE SYNAGRIS



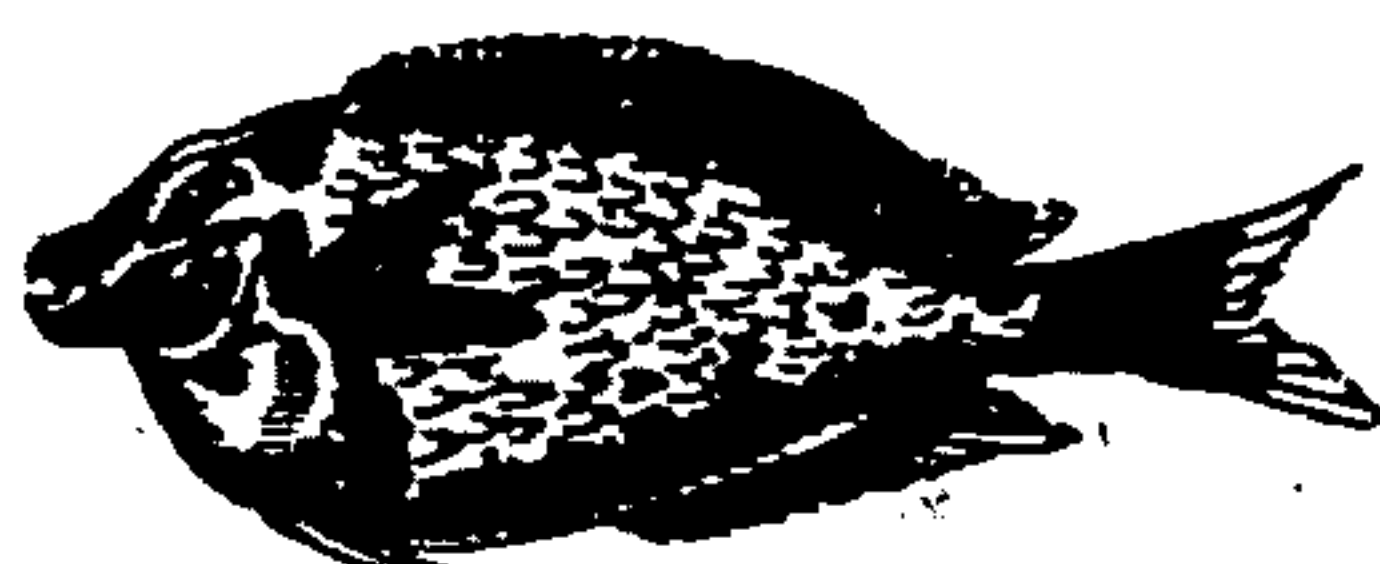
THYNNUS THE TUNNY



THE LYRA or PIPER



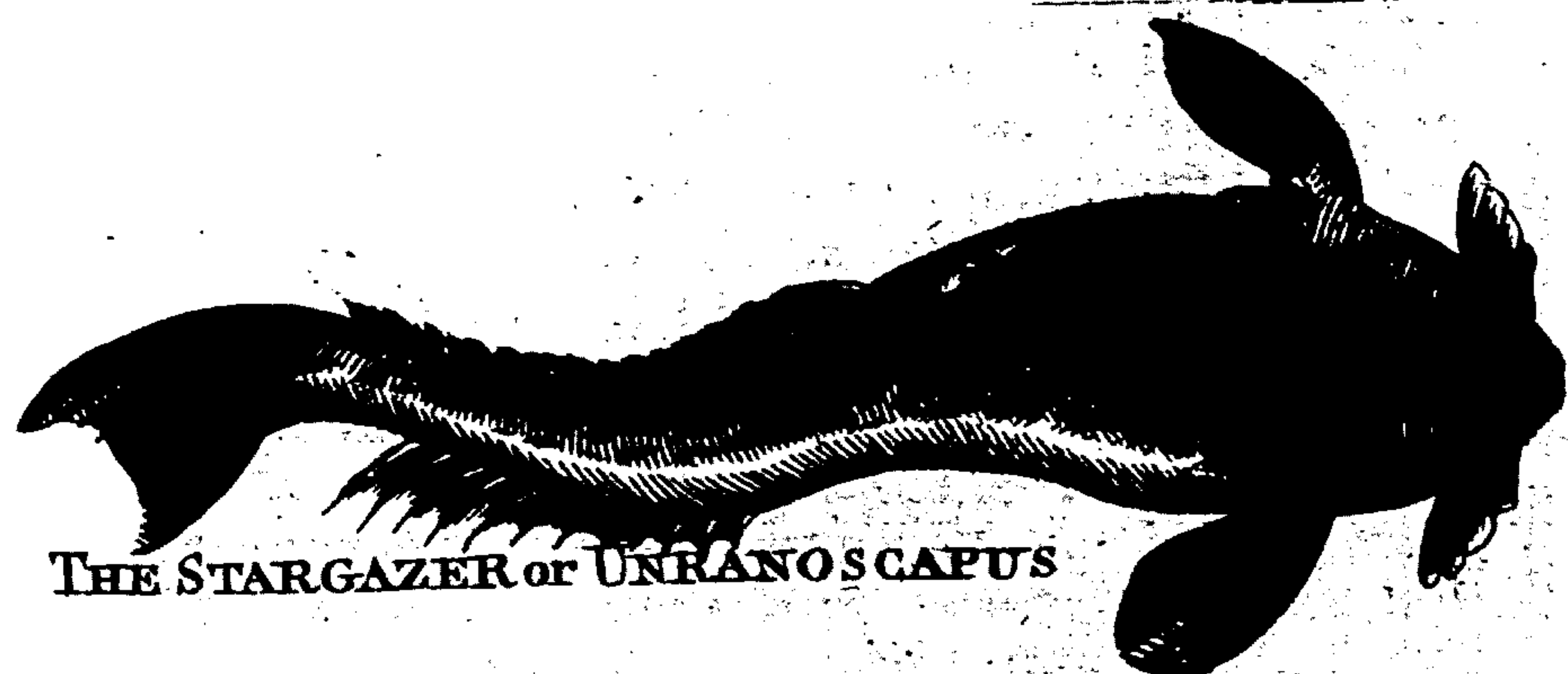
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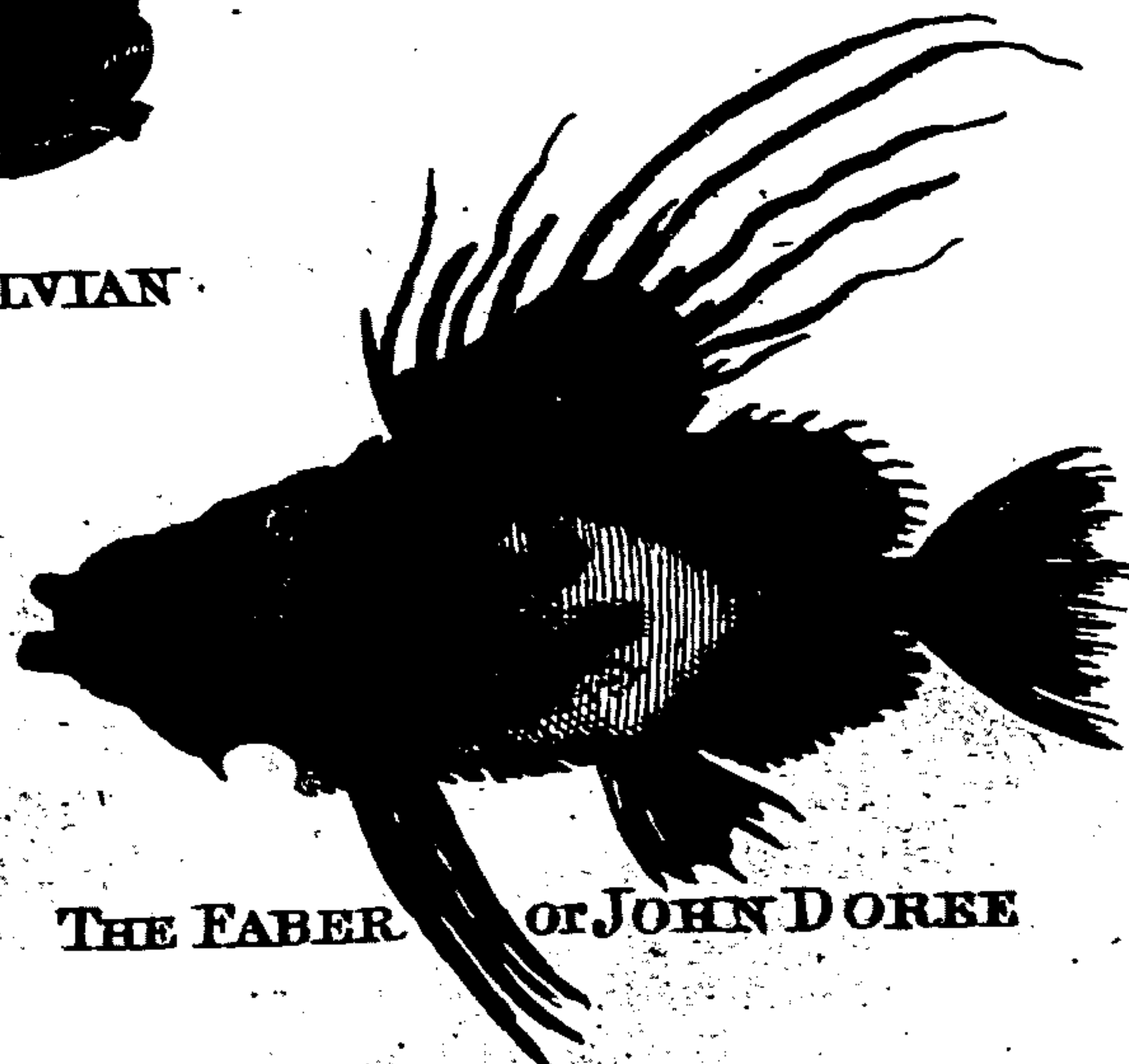
THE SEA SCORPION OF SALVIAN

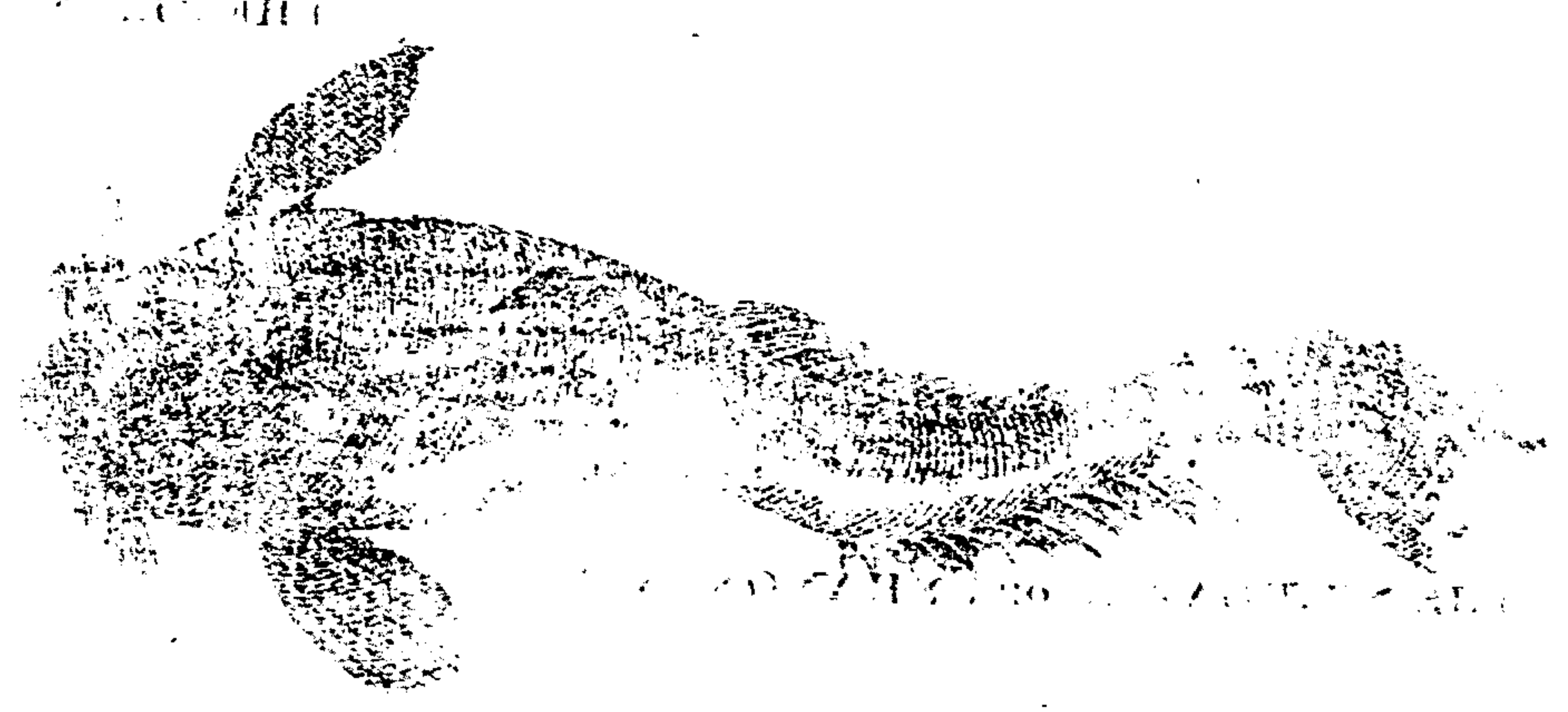
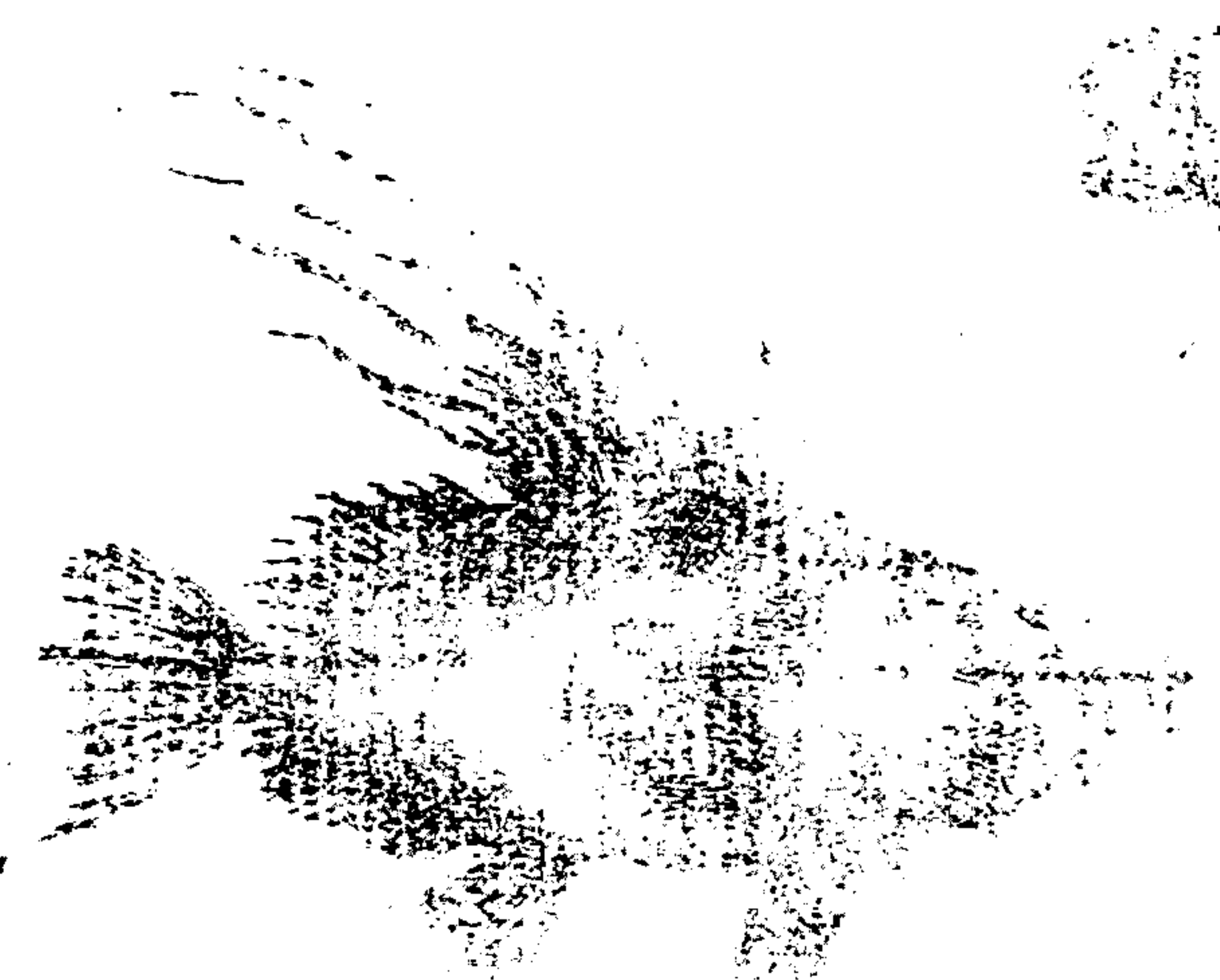
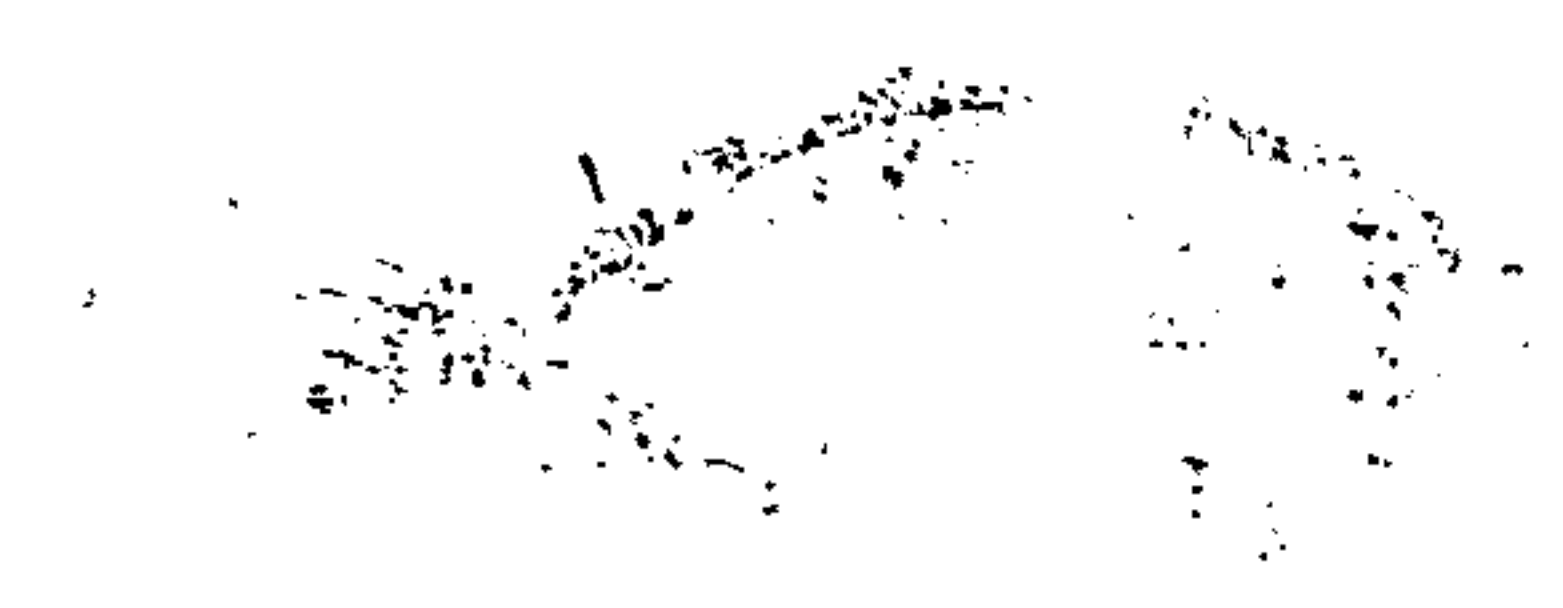
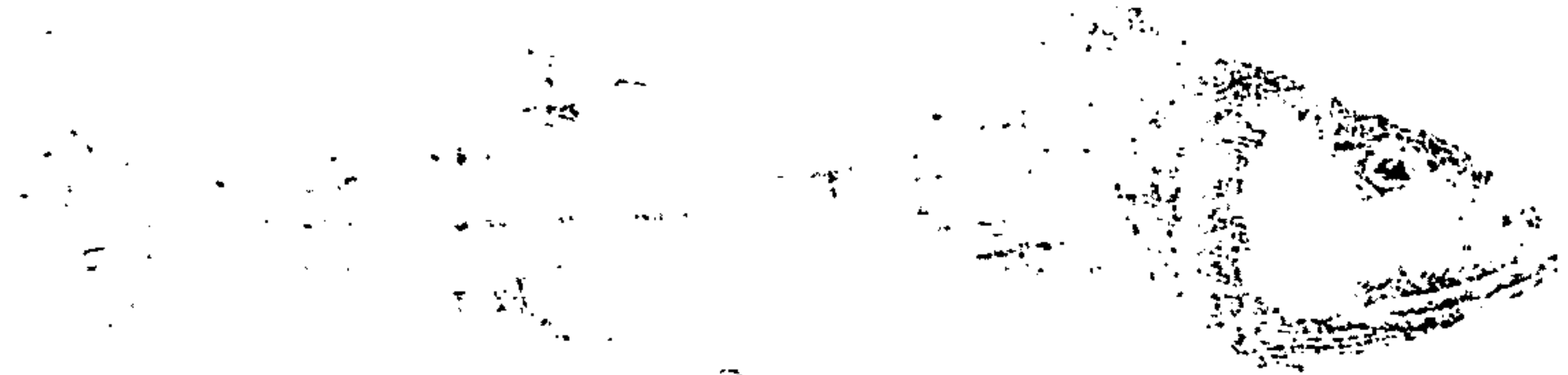
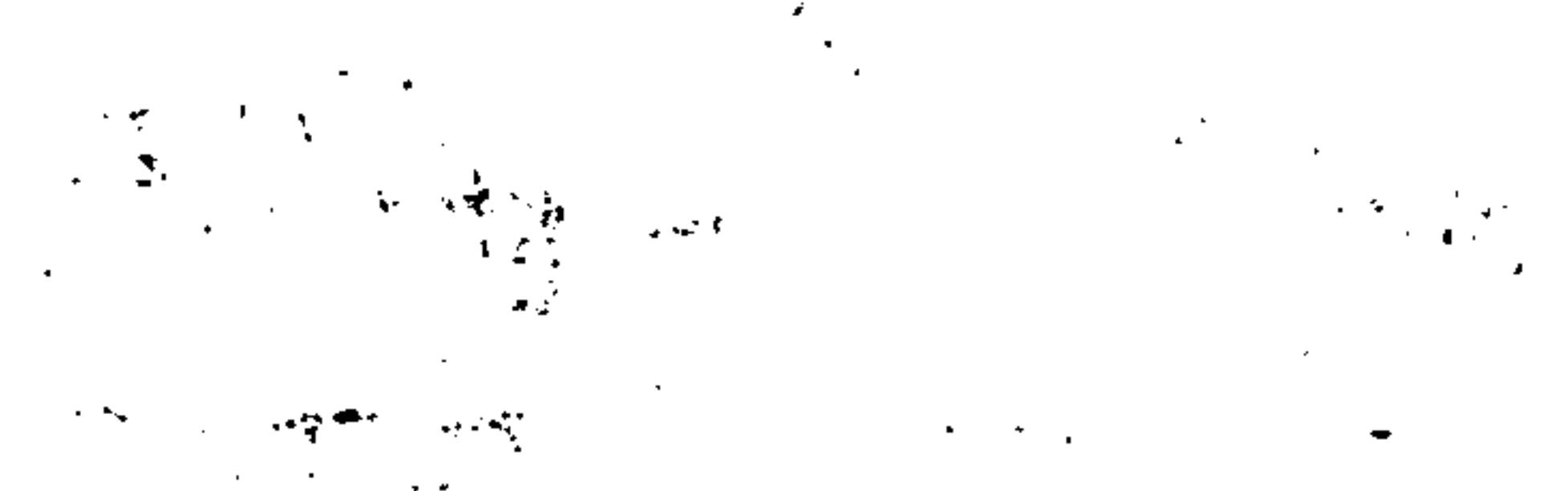
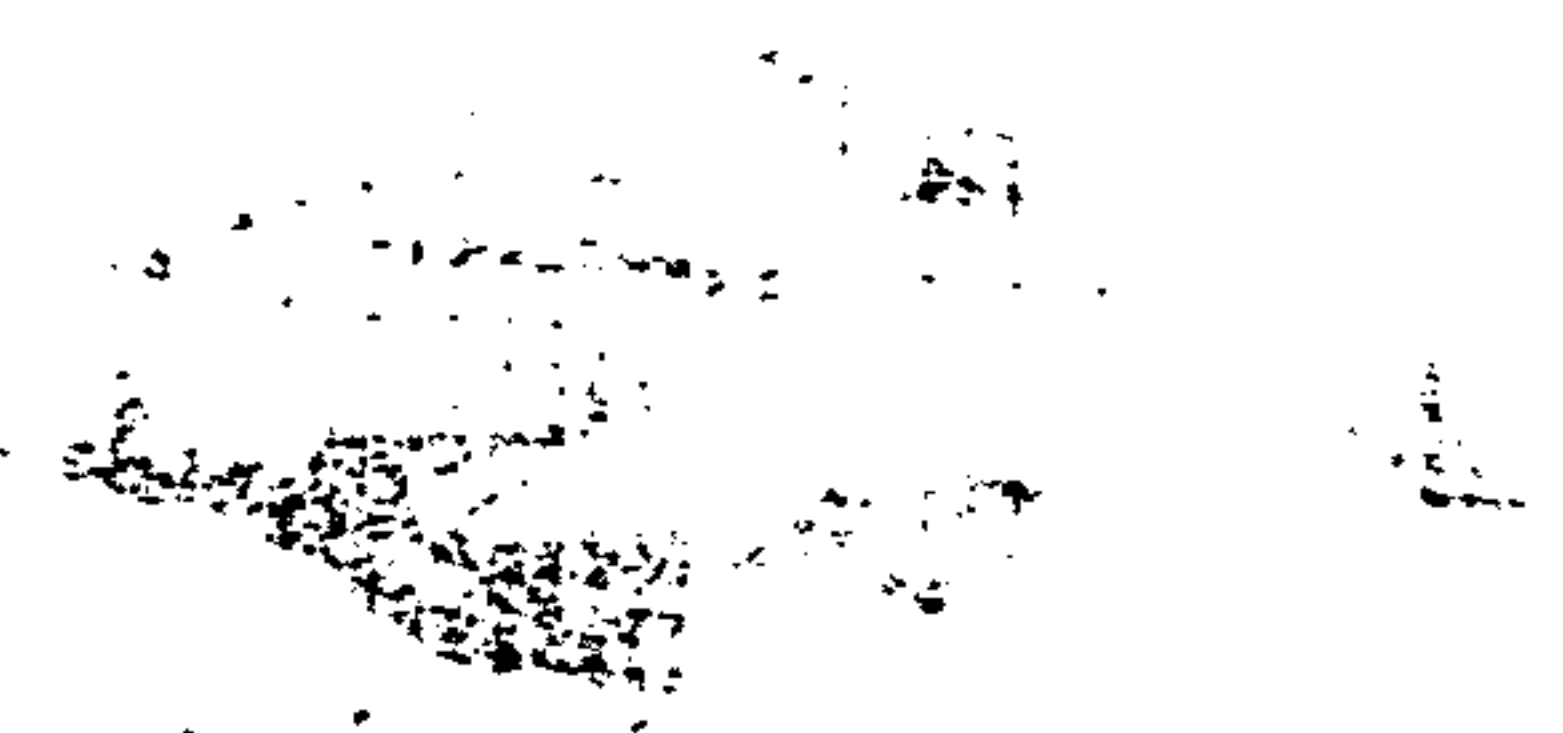
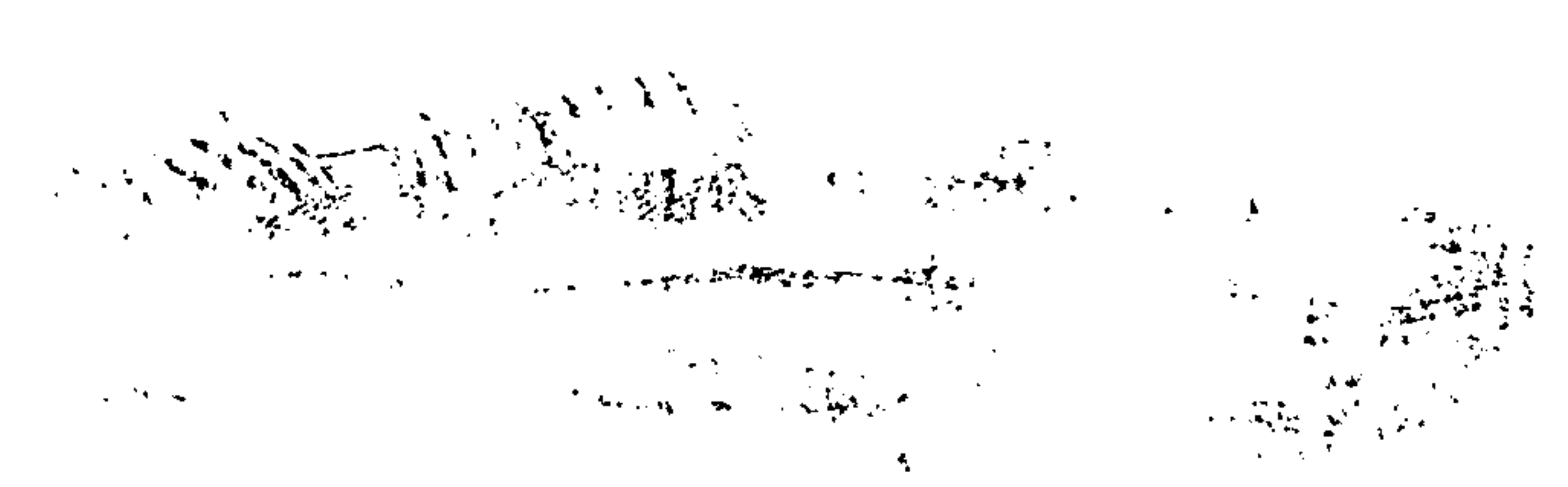
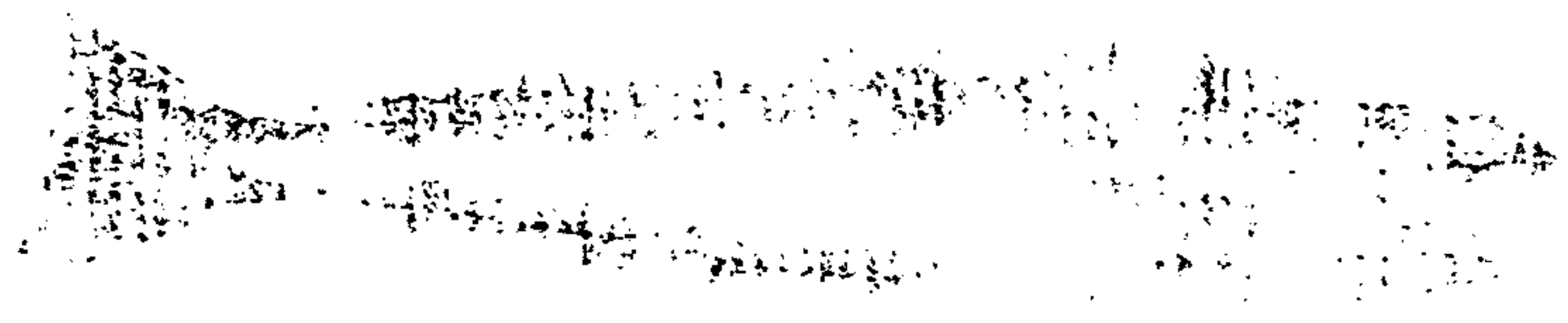
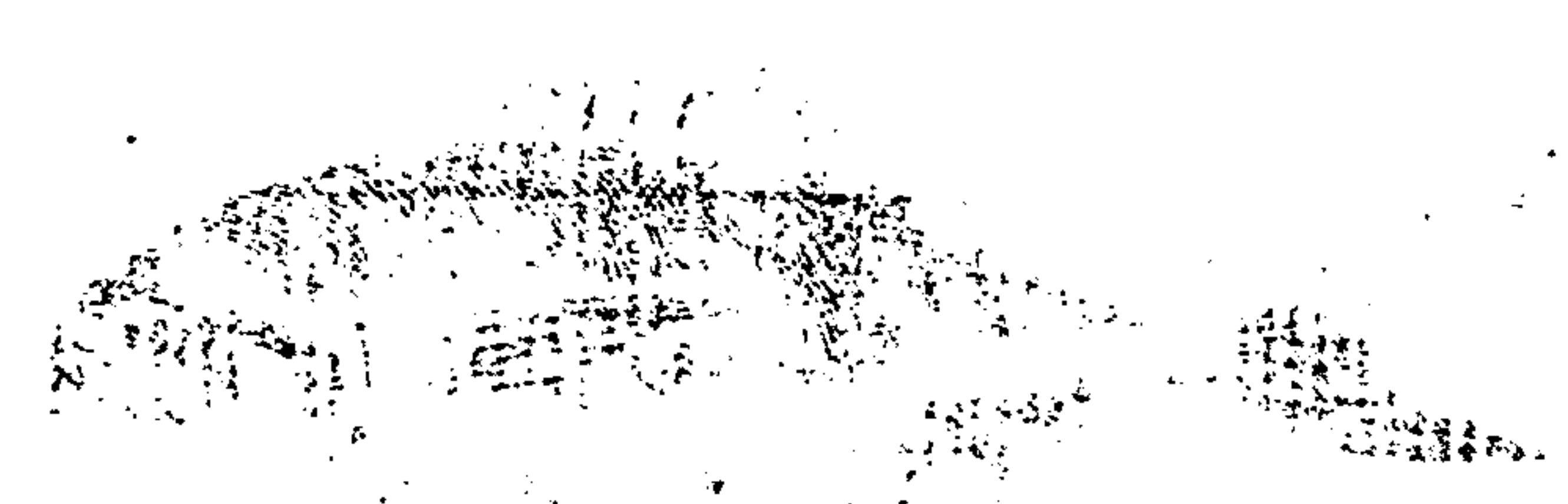
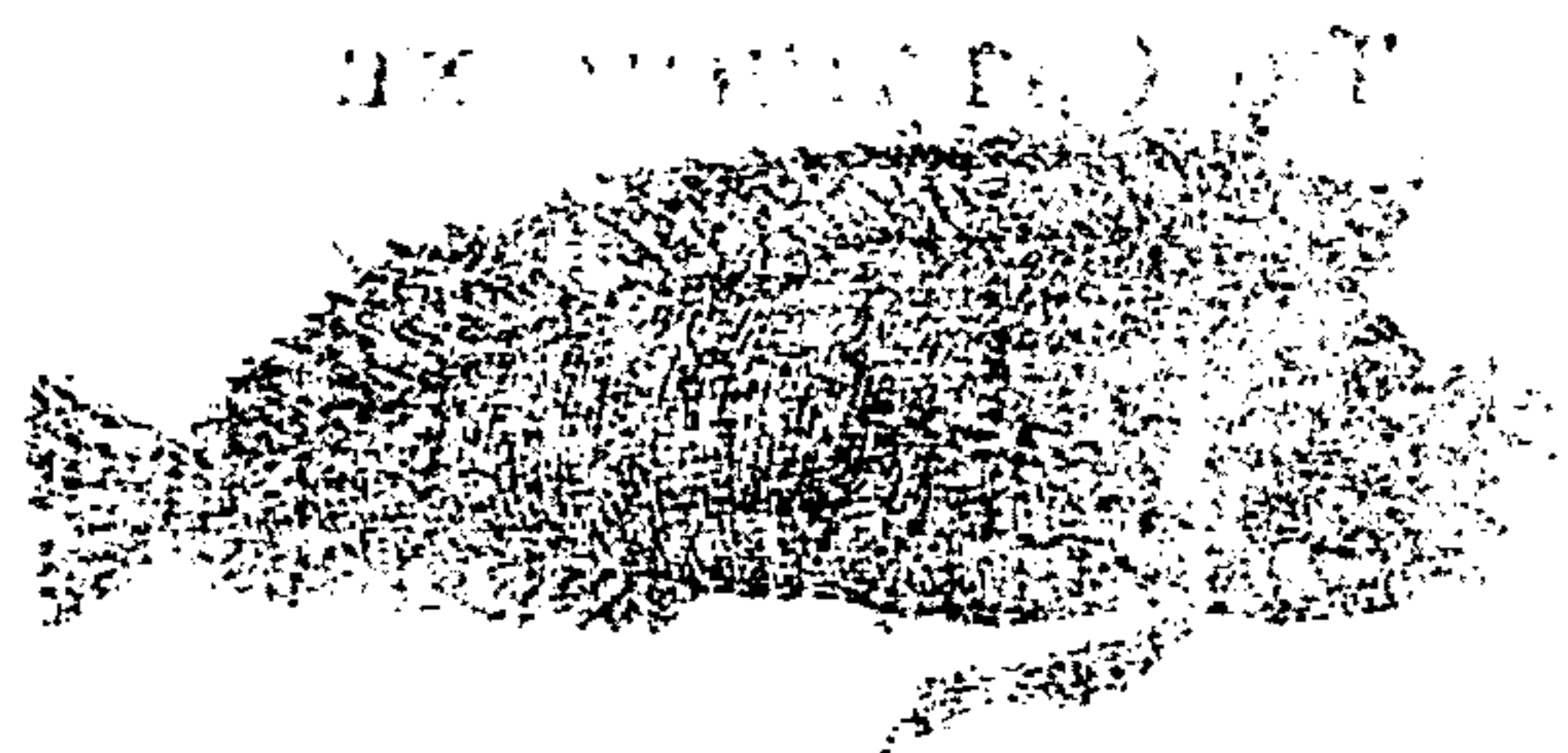
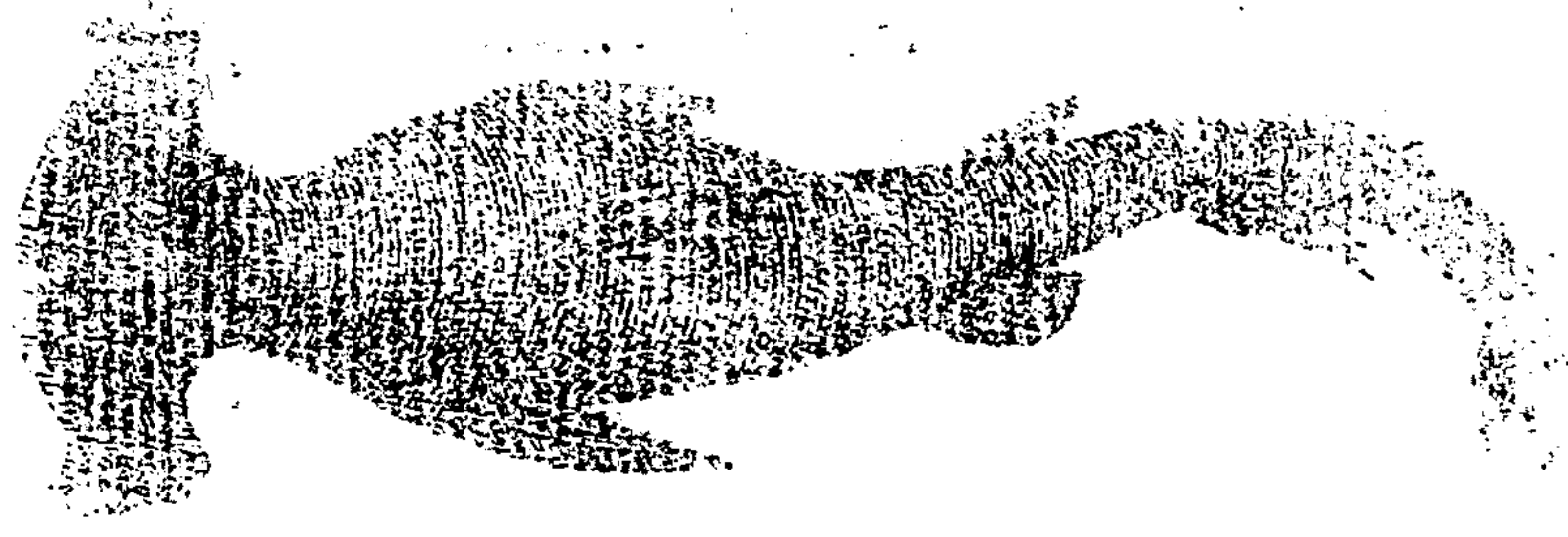


THE STARGAZER or UNRANOSCAPUS



THE FABER or JOHN DORRE





THE SHARK

THE SHARK

NATURAL HISTORY of the WEAVER.

THIS fish is also called the sea dragon. It is a long fish, with flat sides, a straight back, and a prominent belly. The lines on the sides are partly yellow, and partly dusky, running obliquely from the back to the belly; the scales are thin and small, and the head moderately compressed: the eyes are placed on the top of the snout, and very near together. The iris of the eyes is yellow; the under jaw is longer than the upper, and slopes very much towards the belly: the teeth are small; the forward back-fin has six rays; the fin behind this, and which is almost close to it, reaches very near the tail.

The ancients were well acquainted with the qualities of this fish, and mention them without any exaggeration: the wound inflicted by the spines that form the dorsal fin are exceedingly painful, attended with a violent burning, and most pungent shooting; and, if the person who receives it is in a bad habit of body, it sometimes occasions an inflammation that will extend from the arm to the shoulder. Some are of opinion, that these symptoms proceed from something more than the small wound the fish is capable of inflicting. The common remedy used by fishermen is the sea-sand, with which they rub the place affected for a considerable time. In the Universal Museum for 1765, mention is made of a person who was dangerously wounded by this, and was cured by the application of sweet oil, and taking opium and Venice treacle.

This fish grows to the length of twelve inches. It buries itself in the sands somewhat like the sand-eel, leaving only its nose out; and, when trod upon, strikes with great violence. Notwithstanding this noxious quality of the spine, the Weaver is very delicate food.

NATURAL HISTORY of the COMMON COD FISH.

THE Cod inhabits only the northern parts of the world: it seems confined between the latitudes sixty-six and fifty: those which are caught either north or south of those degrees, being few in number, and bad in quality.

Immense quantities of Cod fish inhabit the banks of Newfoundland, and the other sand banks that lie off the coasts of Cape Breton, Nova Scotia, and New England. It is probable they are tempted to resort there on account of the quantity of worms produced in those sandy bottoms. Another cause of their particular attachment to these spots, is their vicinity to the polar seas, where they return to spawn.

The fishing banks of Newfoundland are a sort of mountains covered with the sea: one of these is deservedly called the Great Bank, for it extends four hundred and fifty miles in length, and upwards of one hundred in breadth. It is about seventy-five miles from the island of Newfoundland, in America: the largest, best, and fattest Cod, are those taken on the south side of the bank; those on the north side being considerably smaller. The season for catching them on this bank, is from the beginning of February to the beginning of May. Those that are taken in May and June will keep tolerably well; but those which are caught in July, August, and September, will spoil in a very short time, unless extraordinary care be taken of them. Sometimes, indeed, this fishing is over in a month or six weeks, and at other times it continues upwards of six months.

When Lent approaches, the fishermen hasten homewards, though they have not caught above half of their cargo, because the markets at that time are best. Sometimes, however, they make a second

voyage, before others have got a sufficient cargo for the first. They are all taken with a line and hook baited with the entrails of Cod-fish, a small fish called capelin, and a shell-fish called chams; and an expert fisherman will catch four or five hundred in a day.

On the north of Iceland, very few are taken; but on the south and west coasts they abound. They are found in great plenty on the coasts of Norway, in the Baltic, and off the Orkney and the western isles; after which their numbers gradually decrease, as they advance towards the south; and before they reach the mouth of the Straights of Gibraltar, they seem entirely to cease.

Before Newfoundland was discovered, the principal fisheries of Cod were in the seas of Iceland, and of our western isles; which were the grand resort of ships of all the commercial nations; but the greatest plenty was found near Iceland. This evidently appears, for queen Elizabeth condescended to ask Christian the Seventh of Denmark permission to fish in those seas; though she afterwards repented of her request, and instructed her ambassadors at that court, to insist on the right of a free and universal fishery.

The increase of shipping that now resort to the fertile banks of Newfoundland is astonishing. Great Britain still enjoys the greatest share; which ought to be esteemed as our greatest treasure, as it brings strength to the state, and wealth to individuals.

Providence hath benevolently ordained, that this fish, so useful to mankind, should be so very prolific as to supply more than the deficiencies of the multitudes annually taken. Leuwenhoek counted nine millions, three hundred and eighty-four thousand eggs in a Cod-fish of a middling size.

They begin to spawn, in our seas, in the month of January, and deposit their eggs in rough ground among rocks.

Those fish are most esteemed for the table, which are of a middling size, and they are to be chosen by their plumpness or roundness, especially near the tail, and by the regular undulated appearance of the sides, as if they were ribbed. These, and other fish of this genus, are in the highest season in winter; but the glutinous parts about the head lose their delicate flavour, after they have been twenty-four hours out of the water.

The general weight of those taken on our coasts is from fourteen to forty pounds, though they are sometimes found to weigh sixty or seventy pounds.

The Cod-fish is short in proportion to its bulk; the belly is very large and prominent: the jaws are of an equal length, with a small beard on the lower jaw: the teeth are disposed in the palate as well as the jaws: the eyes are large. This fish has three soft fins on the back: the ventral fins are very slender; and it has two anal fins. It is ash coloured on the back and sides, and usually spotted with yellow: the belly is generally white; though they sometimes vary not only in colour, but in shape, especially that of the head. It has a side line, which is broad, straight and white, till it reaches opposite the vent, when it curves towards the tail.

Cod-fish are salted in the following manner on board the ships: the head is cut off, the belly opened, and the guts taken out; and then they are laid side by side, head to tail, at the bottom of the vessels, for about eight or ten feet square. One layer being compleated, it is covered with salt, and another laid upon that, which is covered as before. All the fish that are taken in one day are thus disposed of; but great caution is used not to cure those which have been caught on different days. They remain thus for three or four days, and are then removed into another part of the vessel, and salted again. They

are suffered to remain thus till the vessel has procured its full cargo, or till they depart for their destined port. Sometimes they are put into barrels and packed up, and they then go under the denomination of barrel-cod.

These fish, however, are not always salted, for some are dried on shore. Such are fished for along the coast of Placentia in Newfoundland, from Cape Race to the Bay of Experts; within which limits, there are several commodious harbours and places to dry the fish in. Those who mean to dry them in the sun, always take them in the summer season, that being the only proper time for that purpose. A smaller sort of fish are usually chosen for drying, because, as they sooner take salt, they are fittest for the purpose.

The tripes, tongues, and rows of the Cod-fish are also salted and barrelled up; the latter of which are of service to throw into the sea, in order to draw other fish together, particularly pilchards. An oil is taken from this fish, which answers all the purposes of train oil, and is much used for dressing leather.

NATURAL HISTORY of the TORSK.

THIS fish is much esteemed for its delicacy. On being boiled, the meat divides into flakes like that of the salmon. The head is small; the upper jaw somewhat longer than the lower. The belly is a little prominent; the side line white, broad, and placed nearer the back than the belly. It never grows to a large size, seldom exceeding thirty inches in length. These fish are found in great quantities in the Baltic and the northern seas, particularly in Brassa Sound, where it is called the tusk, and about the Orkney Isles. It is indeed supposed, that they never wander into the more southern seas.

NATURAL HISTORY of the HADDOCK.

THE Haddock is of a middle size between a whiting and a cod. The back is blackish, and covered with small scales. A black line extends from the upper corner of the gills to the tail; and on the middle of each side, not far from the gills, there is a large black spot, which distinguishes it from all others: the belly and lower parts of the sides are silvery. The eyes are large; a barb hangs from the lower jaw, and the tail is forked. In other respects it resembles a cod; and particularly on the back, are three fins, resembling those of the common cod. Superstition assigns this mark to the impression St. Peter left with his finger and thumb, when he took the tribute out of the mouth of a fish of this species, which has, ever since that miracle, been continued to the whole race of Haddocks.

Large Haddocks begin to be in roe about the middle of November, and continue so till the end of January; from which time till May, they are very thin tailed, and much out of season. The small ones are extremely good from May till February; and those which are not old enough to breed are good in February, March, and April.

The grand shoal of Haddocks comes periodically on the Yorkshire coasts. They appeared on the tenth of December, in 1766, and exactly on the same day in 1767: these shoals extended near three miles in breadth from the shore; and in length, from Flamborough-head to Tinnmouth Castle. Three fishermen, within the distance of a mile from Scarborough-harbour, frequently loaded their boat with them twice a day; taking each time about a ton of

fish. If they threw their lines beyond the distance of three miles from the shore, they caught only dog-fish; a circumstance which shews how exactly these fish observe their limits.

The largest of the Haddocks were sold for eighteen pence to a shilling a score; and the smaller sort were sold for a penny, and sometimes an half-penny per score.

This species, which is the most common in the London markets, seldom grow very large; one of fourteen pounds being of an uncommon size, and extremely coarse: those of two or three pounds are the best for the table.

As soon as large Haddocks are out of season, they quit our coasts, and leave behind them a great number of small ones.

NATURAL HISTORY of the WHITING.

THE Whiting is a fish of an elegant make, and differs from all other fish of this kind, in having the upper jaw longer than the lower; and in the teeth, which appear out of the mouth when it is shut. It has no barb, and the belly fins are placed more forward than they are in the others. It is a slender fish of its size, especially towards the tail, for about the head it is considerably larger in proportion. The head and back are of a pale brown, the belly is silvery; the lateral line is white and crooked: the fins below the vent are speckled with black. The scales are small; the eyes are large, and covered with a transparent loose skin.

They are the most delicate as well as the most wholesome of any of the genus, but never grow very large; the usual length being ten or twelve inches, though they have been seen twenty inches long. In spring they appear in vast shoals in our seas, from half a mile to three miles from the shore. Vast numbers of them are taken by the line, and they afford excellent diversion to the anglers.

The fishing for Whittings in a boat or smack is diversion enough, because they bite very freely, and require no very nice tackle to catch them. You may know where to cast anchor by the sea gulls, for they never fail to hover over the place where the Whittings lie, and if they seem to dip into the water every now and then, you are sure not to lose your labour.

At Portsmouth, the tradesmen frequently get small smelts as baits, and find good diversion amongst the Whittings; but if smelts are not to be had, a mussel, a herring, a hairy worm, a lob, or a marsh worm, are good baits. You need not use any rod, but a *Pater-noster* line, with half a dozen hooks half a yard distant from each other. The line may be fastened to the inside of the boat, by which means you will have but little trouble, except in drawing up your fish, and putting on fresh baits. The time of waiting before you examine your hooks need not be long, for they are a very greedy fish.

The WHITING-POUT.

In proportion to its length, the Whiting-Pout is extremely broad, by which it may be distinguished from all others of the kind. The extremity of the tail and fins are blackish, and there are large black spots at the roots of the gill fins on each side. It never grows to a large size, seldom exceeding eleven or twelve inches in length. The back is very much arched, the mouth small, and the beard short. The colour of the body is whitish, but more obscure on the back than on the belly. The lateral line is white, broad, and crooked. The back fin, which is of a triangular form, is produced into a longish horn; the tail is even at the end, and the scales are small. The young of these fish are called Whiting maps in London,

don, where they are generally very plenty in the month of October.

NATURAL HISTORY of the BIB or BLIND.

THE Bib has a barb under its chin, in which particular it agrees with the cod; but it differs from it in size, shape, and colour, being shorter, broader, and whiter. The scales adhere closely to the skin, and are twice as large as those of the cod. The cod is also furnished with a spine or thorn at the tail fin, of which this fish is destitute: it grows to the length of eleven or twelve inches: the body is deep, and the sides compressed: the eyes are covered with a loose membrane, which it is said the fish can blow up like a bladder: the mouth is small, and the teeth are disposed like others of the kind. It is esteemed delicate food, and resembles the whiting in taste.

NATURAL HISTORY of the POOR.

THE Poor is the only species of eod-fish with three dorsal fins that has hitherto been found in the Mediterranean sea. It is found near Marseilles, and sometimes in such amazing quantities as to become a perfect nuisance; for no other kinds of fish are taken during that time. It is pretty good for food, but cannot be either salted or dried. It is a very small species, not exceeding six inches in length. The back is of a light brown colour, and the belly of a dirty white; the eyes are covered with a loose membrane: on the chin is a small beard; and on the gill-covers, and the jaws, there are nine punctures on each side.

NATURAL HISTORY of the COAL FISH.

THIS fish is called the Rawling Pollack in Cornwall. It takes the name of Coal-Fish from the colour it sometimes assumes. These fish are common on most of our rocky and deep coasts, but particularly those of Northumberland, Yorkshire, and Cornwall. The flesh is not so good as that of a cod, though it is superior to that of a haddock. The form of the Coal Fish is more elegant than that of the cod; they grow to the length of two feet and an half, and weigh about twenty-eight or thirty pounds at most. The head is small, the under jaw a little longer than the upper, and the iris is silvery, marked with a black spot on one side. The young appear at the beginning of July, in vast shoals on the Yorkshire-coast; they are at that time about an inch and an half long. In the month of August, they are from three to five inches in length, at which time they are taken in great numbers with the angling rod, and are then esteemed a very delicate fish. When large they are salted, and dried for sale.

NATURAL HISTORY of the POLLACK, or WHITING POLLACK.

THIS is larger than the common Whiting, but nearly of the same shape; it is indeed a little broader, and not quite so thick; the back is of a dirty green colour. It differs from a cod fish in being smaller, broader and thinner; in having a lesser head, in being destitute of a barb, and in having the lower pair of fins much smaller. The sides, beneath the lateral line, are variously streaked with a dusky yellow, and the body is scaly; but the scales are very small. The mouth is large, the teeth small; the eyes are of a silver colour, and large; the under jaw is longer than the upper; the head and

body rises pretty high, as far as the first dorsal fin. The colour of the back is generally dusky; though in some it is inclining to green. The sides beneath the lateral lines are marked with lines of yellow, and the belly is white.

These fish are common in many of our rocky coasts. In summer they are seen in great shoals frolicking on the surface of the water, and throwing themselves into variety of forms. At that time they are so wanton as to bite at any thing that appears on the top of waves, and are frequently taken with a goose's feather fixed to the hook. They are a good eating fish; but never grow to a very large size; they seldom exceed seven or eight pounds in weight.

The teeth of the Pollack are said to be absorbent when reduced to powder, and good against fluxes and spitting of blood.

This fish has the English name of Whiting Pollack bestowed upon it, from its likeness to a whiting. However, it is larger, proportionably broader, and not quite so thick. He lives upon fish, particularly sand-eels, and is frequently taken near Penzance and St. Ives, in Cornwall; and is likewise often caught in rock-fishing. He struggles hard for his life, and yields the angler good diversion. Proper baits in rock-fishing, are small smelts, a live shrimp, a cockle, a perriwinkle, a lobster, a marsh-worm, and a hairy worm, that is found under the sand at the tide of ebb. This last, as it is the most natural, so it is the most successful bait; besides, it has this advantage, that it needs no scowering as other worms do.

If you fish out of a boat or smack, you will require no rod, and your line may be sixty yards long, with three or four hooks one above another, and baited with different baits. Some inches above the highest hook must be fixed about half a pound of lead. When you fish, you must coil your line in several rings in your left hand, and holding your lead in your right, throw it as far into the sea as you can, taking care to hold the loop of your line fast in your hand, lest you lose it. The best time for sea-fishing is in warm weather, and early in the morning, or after sun-set, provided the tide has been ebbing near an hour.

Some in this kind of fishing choose to place themselves under the covert of a rock, where they shelter themselves, and sit secure from the inclemencies of wind and weather, and this, in a proper sense, may be termed rock-fishing. In this case a rod is necessary, as likewise a float. It is common to use two hooks, one to lie at the bottom, and one to hang about mid-water; and if a little mischievous fish, called a miller's-thumb, should happen to carry your bait into the clefts of the rocks, you must have patience till he thinks proper to come abroad, for there is no dealing with him by force.

NATURAL HISTORY of the HAKE.

THESE fish are from a foot and an half to two feet and an half in length. It is of a slender form like that of the river-pike, and is therefore sometimes called the sea-pike. The back is of a pale ash colour, and the belly of a dirty white, with small scales. The head is broad and flat, and the mouth large, and full of sharp teeth, like that of a pike; the eyes are large, and of a gold colour, being covered with a transparent membrane. The tail is not forked, but terminates in a right line.

The Hake is from a foot and an half to near twice that length: it is esteemed a very coarse fish in England, and is seldom admitted to table either fresh or salted. It is known by the name of *poor John* when it is cured.

There

There was formerly a vast stationary fishery of Hake on the Nymph Bank, off the coast of Waterford; but Mr. Smith, in his history of Waterford, complains of its decline. The irregular migration of fish is sometimes owing to their being pursued and harrassed by an unusual number of fish of prey; and sometimes from a deficiency of the smaller fish, which served them as food.

There is also a fish called the lesser Hake, which is found from eleven to eighteen inches long. It is of a pale ash-colour.

NATURAL HISTORY of the LING.

THIS fish takes its name from its length, being a corruption of the word long. It resembles the hake both in shape and colour, except that it is longer, and its scales are not closely adhering to the skin. The body is slender; the head flattish; the upper jaw longer than the lower: the teeth in the upper jaw are small and very numerous; those in the lower are few, slender, and sharp. It has a small beard on the chin. The tail is round, not forked; and on the back fin there are a multitude of rays. The usual size of a Ling is from three to four feet in length; but they are sometimes upwards of seven feet long.

The flesh is much better and wholsomer than that of the hake, and is indeed, when cured, preferred to all other salt fish.

They abound about the Scilly Isles, on the coasts of Scarborough, and those of Scotland and Ireland, and form a considerable article of commerce: it was even considerable so long ago as the reign of Edward the Third, an act being made in his 31st year for regulating the price of lob, Ling, and cod.

Great quantities are salted for exportation, as well as for home consumption. When cut or split for curing, it must measure at least twenty-six inches from the shoulder to the tail: if smaller than that, it is not reckoned a sizeable fish, and therefore is not entitled to the bounty on exportation.

They are in perfection in the Yorkshire seas, from the beginning of February to the middle of May. In June they spawn, and deposit their eggs in the soft oozy ground of the mouth of the Tees. The males, at that time, separate from the females, and resort to rocky ground near Flamborough-head, where the fishermen take vast quantities, without ever finding a single female among them.

The liver of a Ling is extremely white, so long as the fish continues in season, and abounds with a fine flavoured oil; but as soon as it goes out of season, the liver becomes very red, and affords no oil. This is, in some degree, the case with cod and other fish, but the difference is not so very remarkable.

NATURAL HISTORY of the BURBOT, or EEL POUT.

THE body of this fish has some resemblance to that of an eel, except that it is shorter and thicker: its motions also resemble those of the eel; and it is equally smooth, slippery, and slimy. The head is broad and depressed like that of a toad, and the jaws are furnished with very small teeth, which make them as rough as a file. The tail is flat and roundish. A barb of about half an inch long grows on the under jaw; and there are two short barbs between the nostrils and the snout. The colour of this species varies; some being dusky, others of a dirty green, spotted with black, and sometimes with yellow.

The Burbot is found in the Trent, the Witham, and in the great Eastfen, in Lincolnshire. Though of a very disgusting appearance when alive, it is a

very delicate fish for the table. It is extremely voracious.

They are in great plenty in the lake of Geneva, where it is known by the name of the lota. They are seldom found in our waters above the weight of two or three pounds, but they are considerably larger in some places abroad.

Their places of resort are the same as the eels, if within the reach of the tide; and the best time to take them is after a storm of thunder and lightning with heavy rain. The best bait for them is a small gudgeon, roach, or dace: your hook should be armed, on account of his sharp teeth, and because he is a vigorous strong fish, and struggles hard for life. His flesh is good and sweet, and greatly esteemed. His usual size is from fourteen to twenty inches.

NATURAL HISTORY of the SEA LOACH.

THIS is termed the whistle-fish in Cornwall. It is from nine to twelve inches in length, and the head is large and flat. Its mouth resembles that of an eel, furnished with numerous small teeth, disposed along the jaws in the form of a broad plate; it has also a set of small teeth, disposed in a triangular form, in the roof of the mouth. The eyes are near the end of the snout, and their iris is of a silver colour. The scales are very small, and the head, back, and sides, are variegated with large spots of a darkish red. In a dent or furrow near the middle of the back, instead of a fin, there is a low membrane, or skin, edged with very small hairs; by which it may be distinguished from all other fish of this kind. It varies greatly with regard to the spots: sometimes they are red, sometimes white, and sometimes it has no spots. The colour of the head and body are of a reddish yellow; but the sides are lighter, and the belly almost white. This species usually frequents the rocky shores of these islands, and is sometimes taken with a bait.

NATURAL HISTORY of the CRESTED BLENNY.

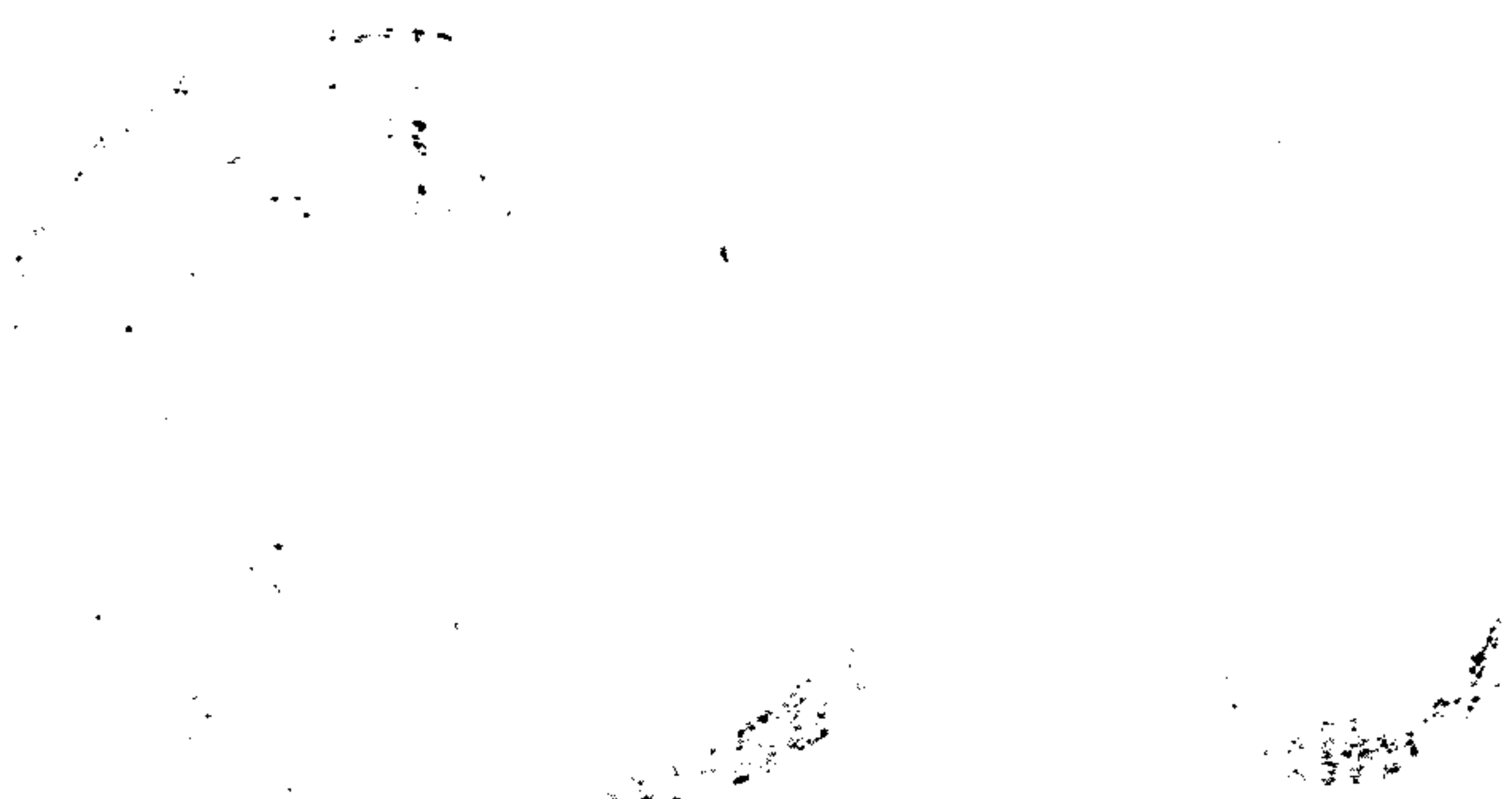
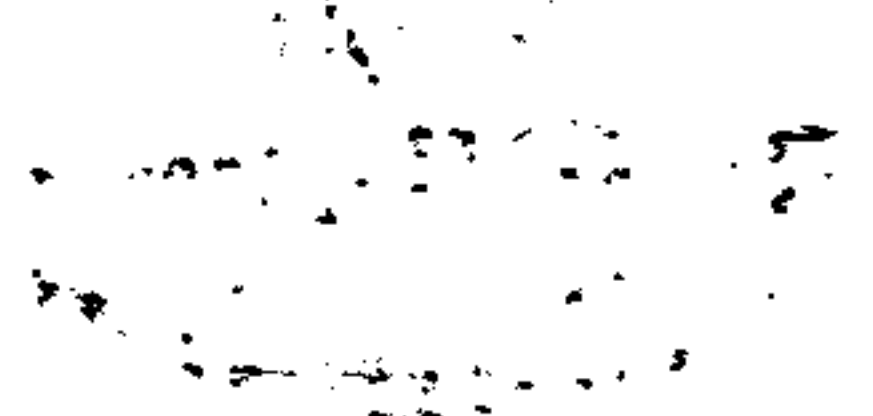
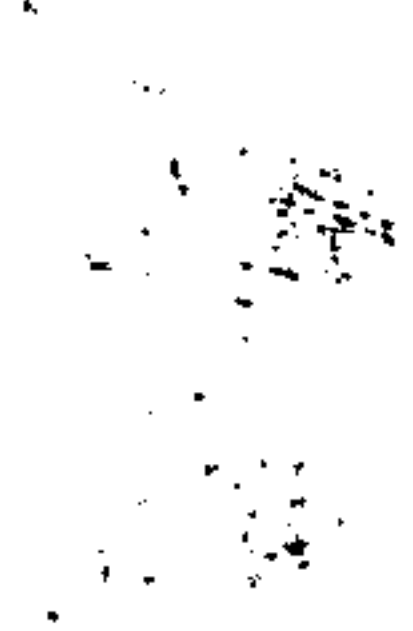
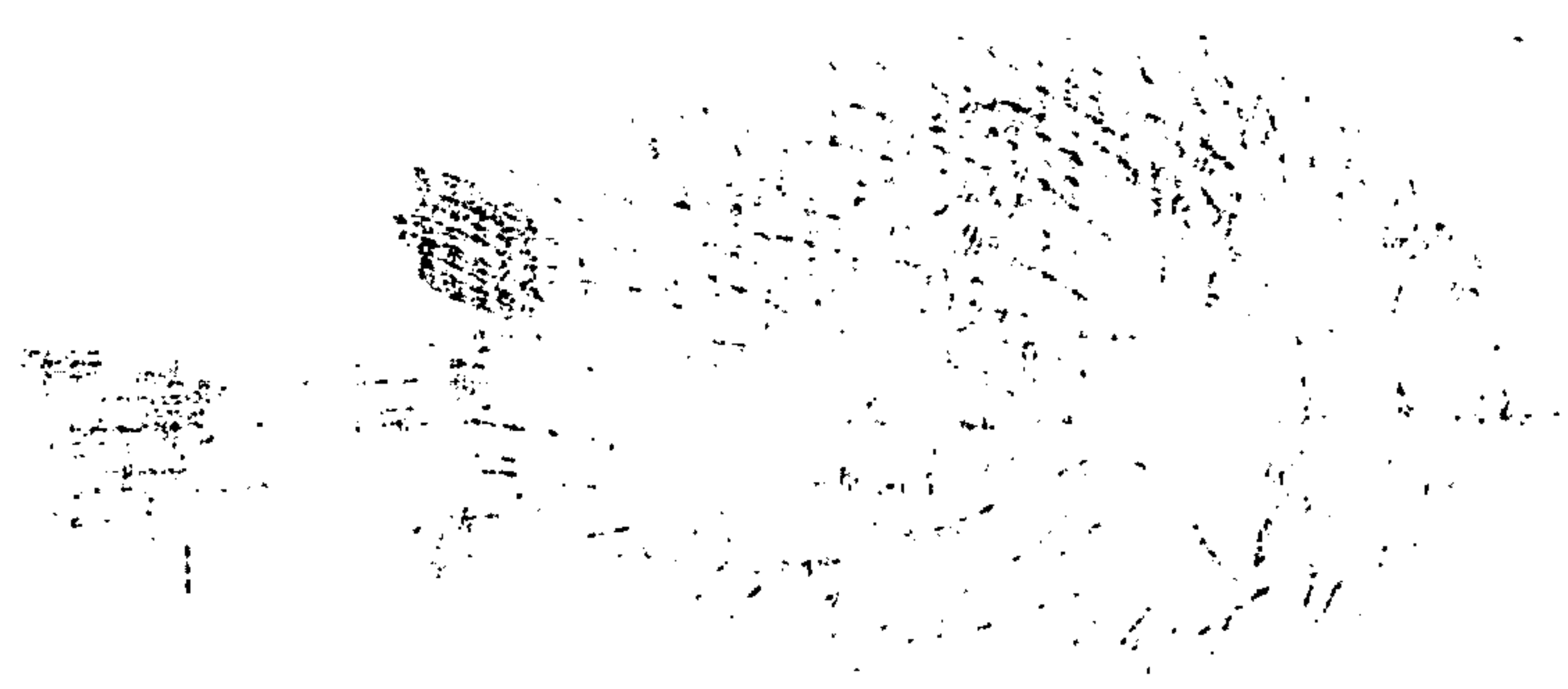
THIS is sometimes found on our rocky shores, and is usually about four or five inches in length. On the head it has a small crest-like fin, which it can erect or depress at pleasure. It has a triangular lump on the top of the head, between the eyes, which is red about its edges. The colour is brown and spotted, and the body is slippery and smooth.

The SMOOTH BLENNY.

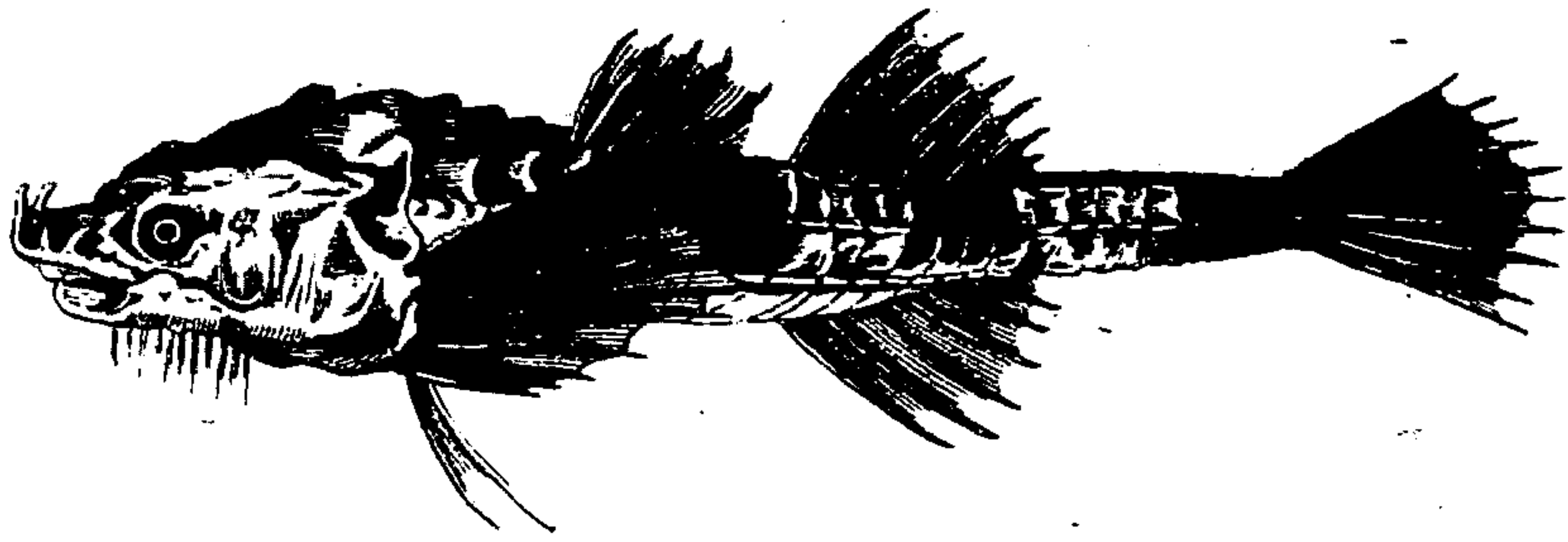
The length of this fish is about five or six inches: the head is large, and sloping suddenly to the mouth: the iris is red: the teeth are sharp, slender, and close set: it has twenty-four in the upper, and nineteen in the lower jaw. The tail consists of twelve branched rays, and is rounded at the end. Some of these are black; others of a deep olive colour, marbled with a deeper tint; and others are spotted with white. This fish is very tenacious of life, and will live almost a whole day out of water. It feeds on shells, and small crabs.

The SPOTTED BLENNY.

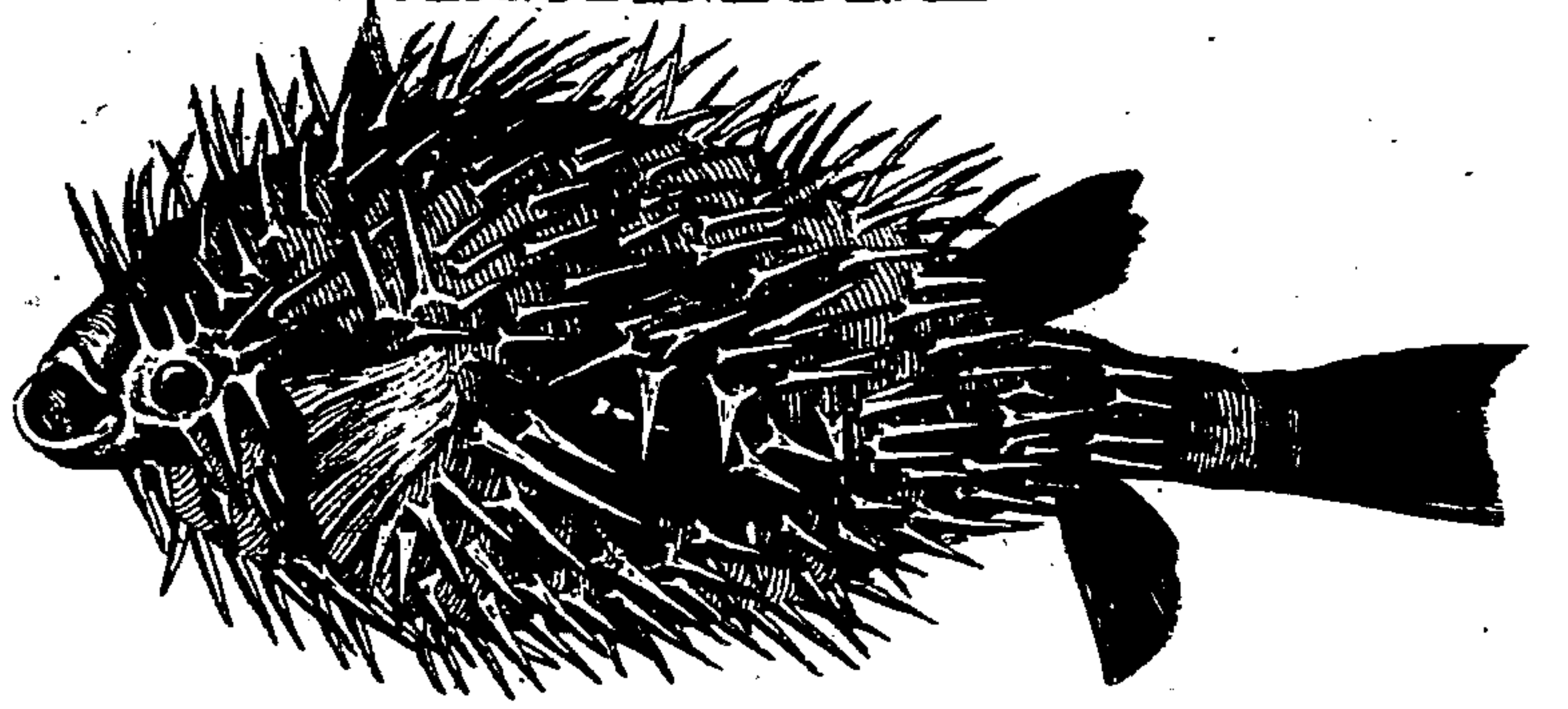
This species, and the smooth Blenny, are found in great plenty, lying under the stones among the tang, on the rocky coasts of Anglesea, at the low water mark, and are used as a bait for larger fish. It is about six inches in length, and half an inch in depth: the sides are very much compressed, and extremely thin: the mouth is small, and the iris of the eye is whitish. The pectoral fins are of a yellow colour



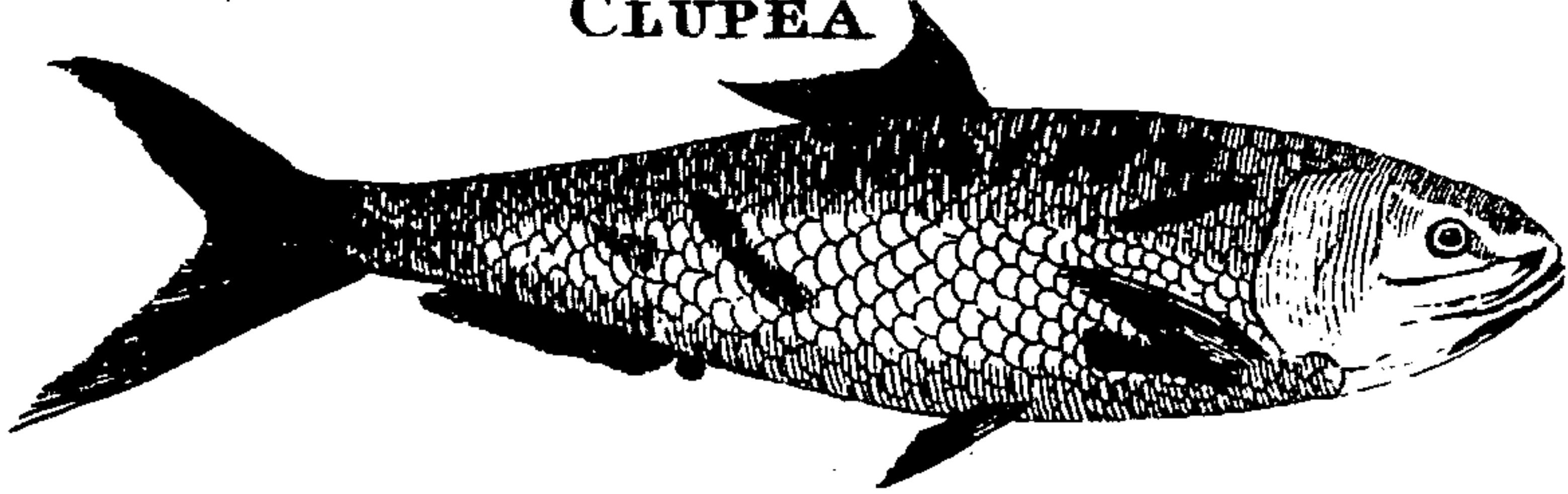
POGGE



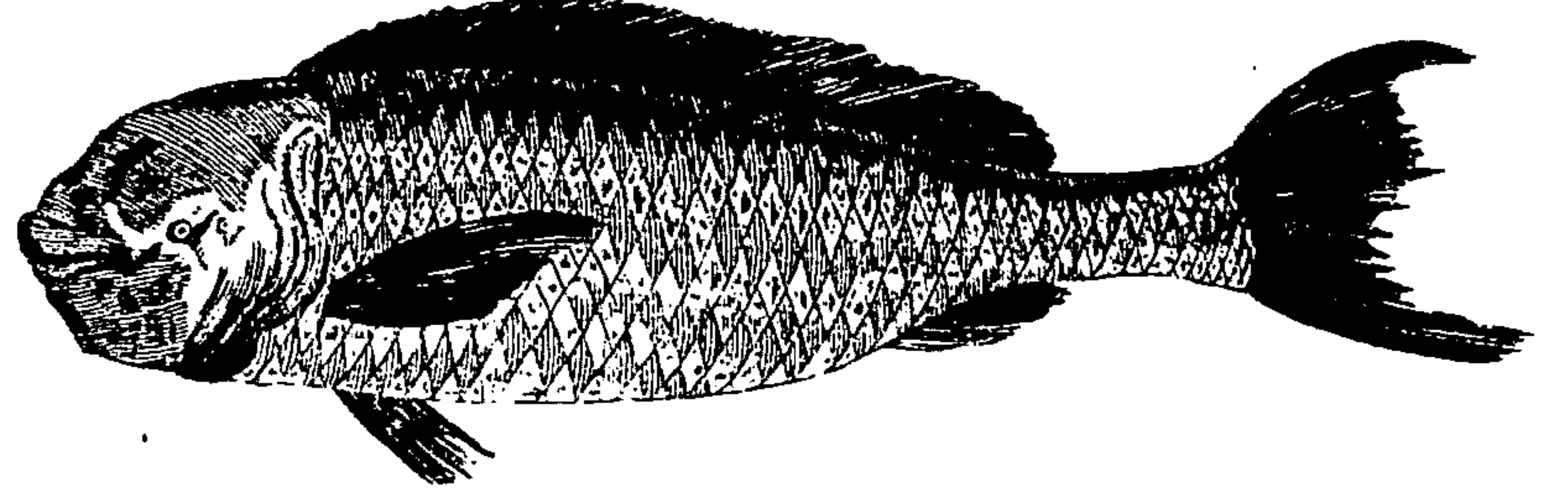
PORCUPINE FISH



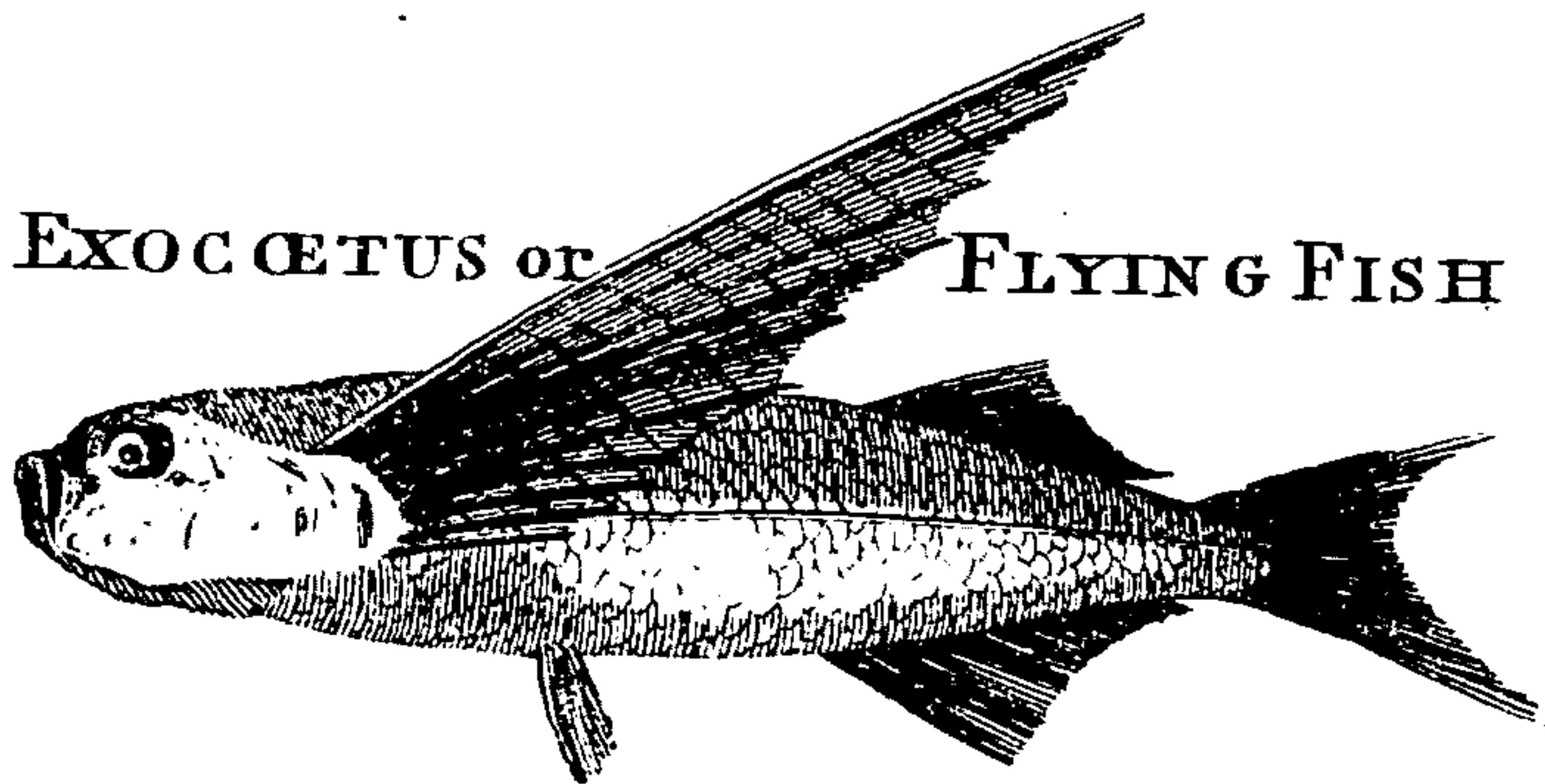
CLUPEA



PUDIANO VERDE



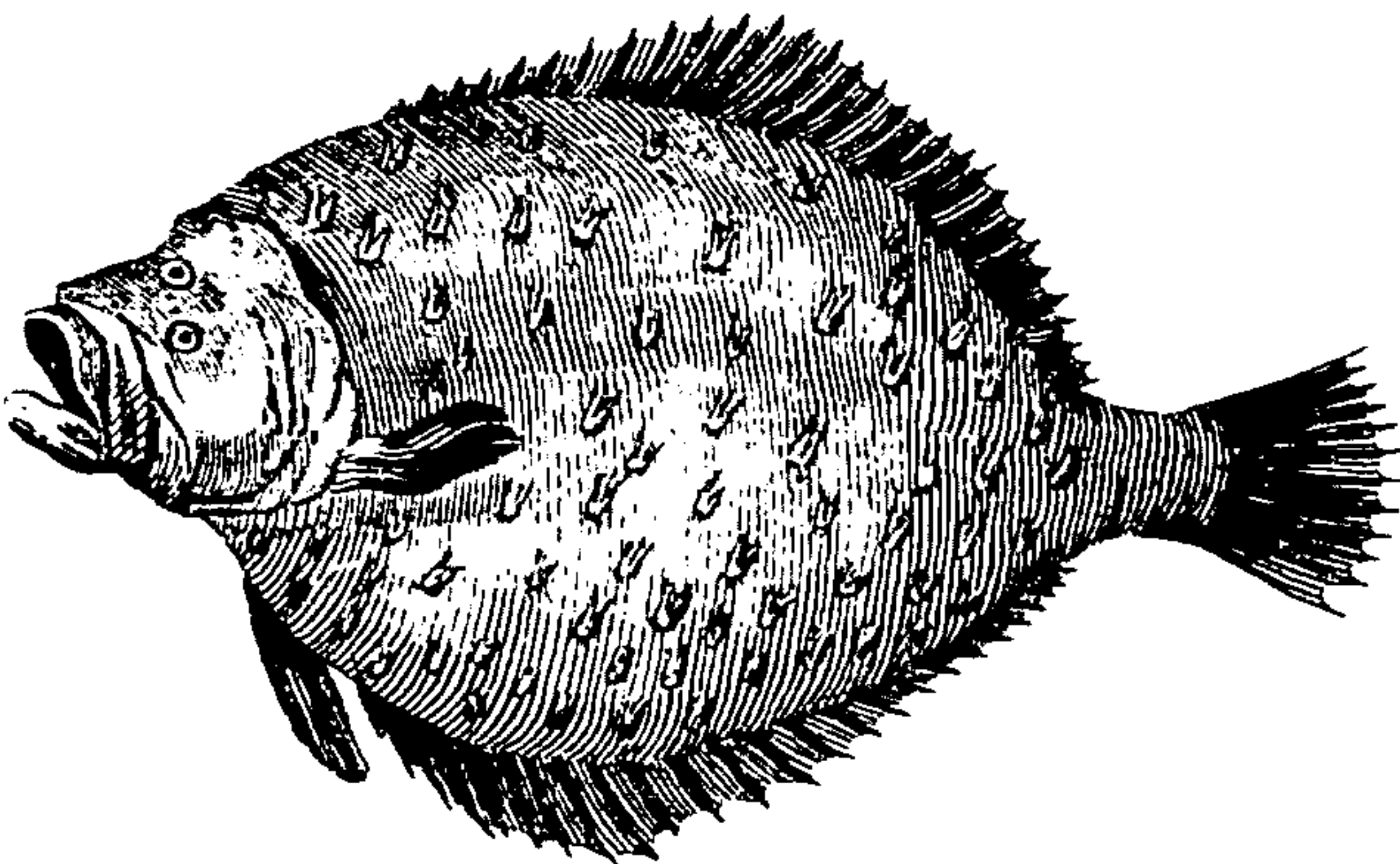
EXOCÆTUS or FLYING FISH



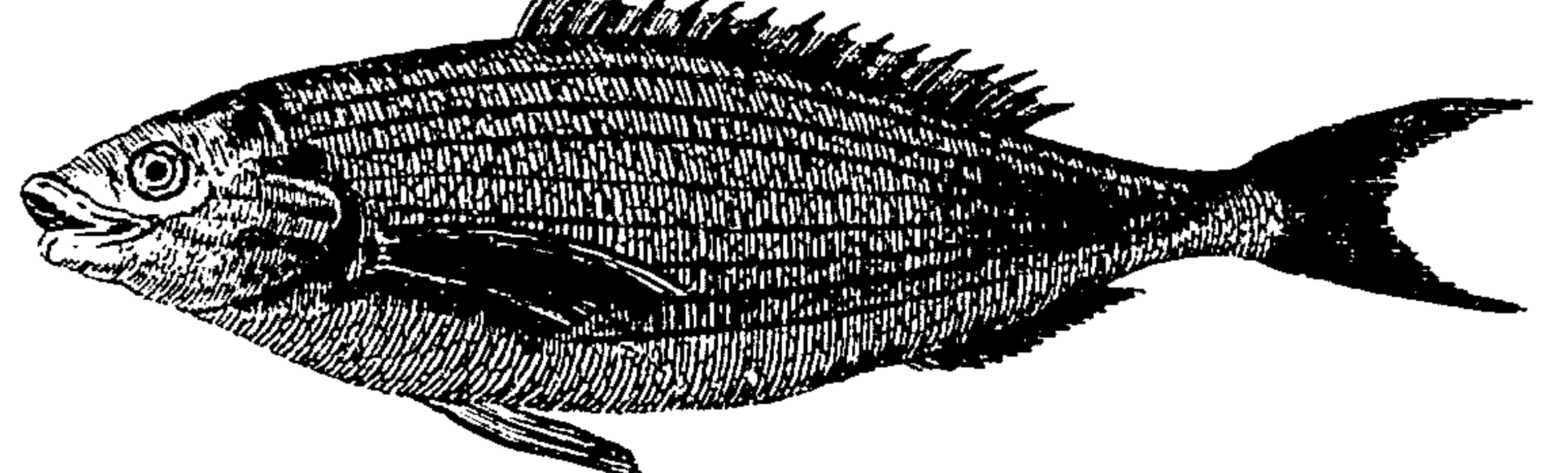
REMORA



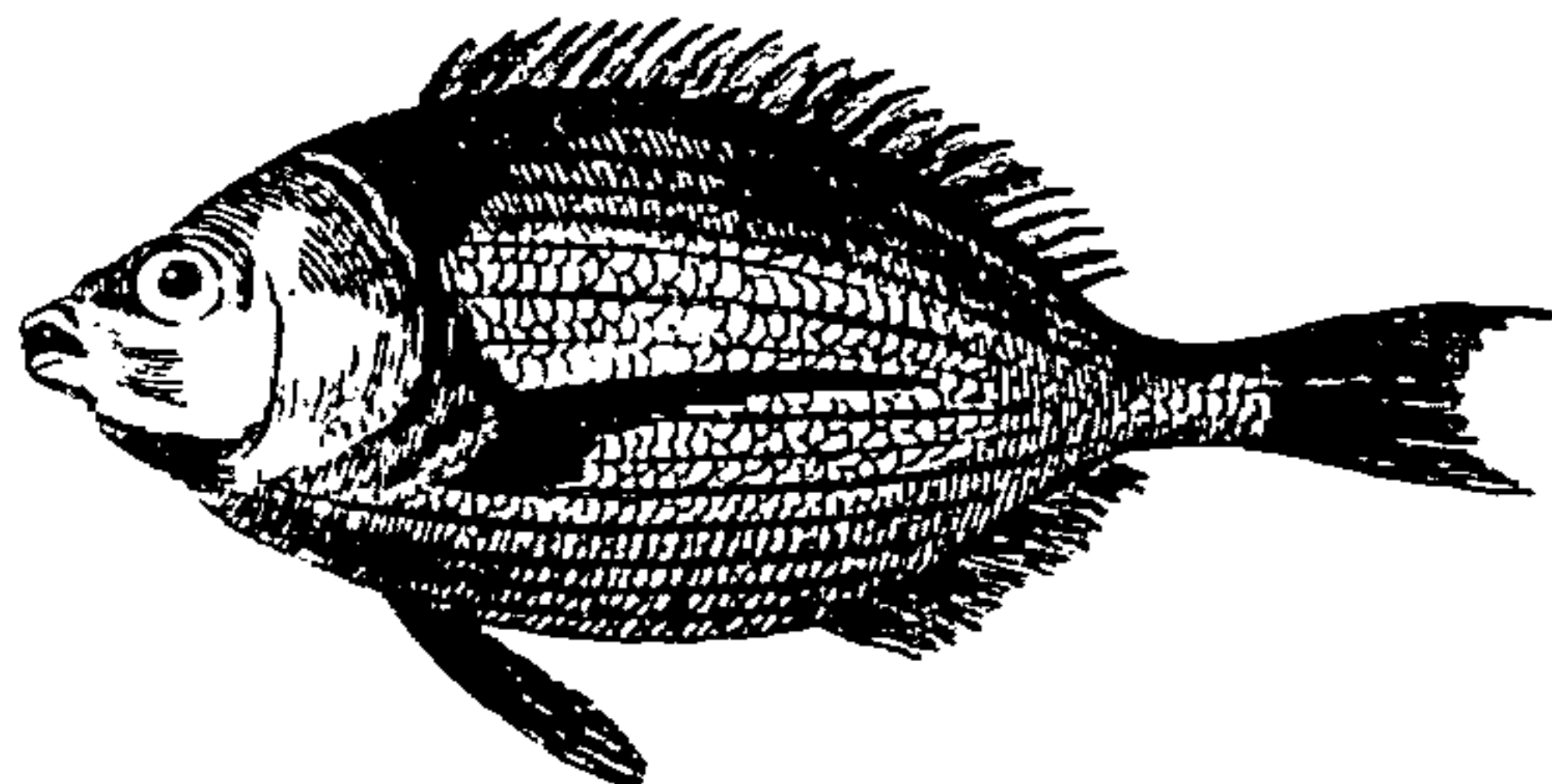
RHOMBUS ACULEATUS



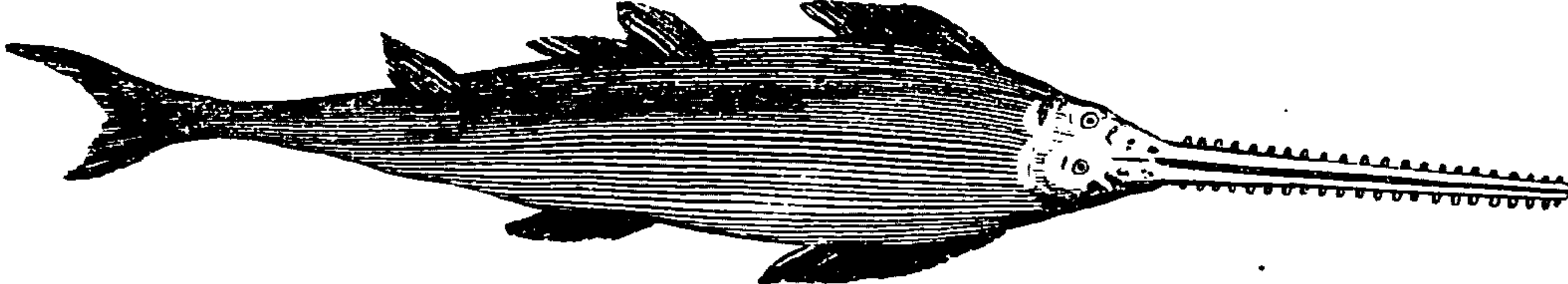
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SARGUS



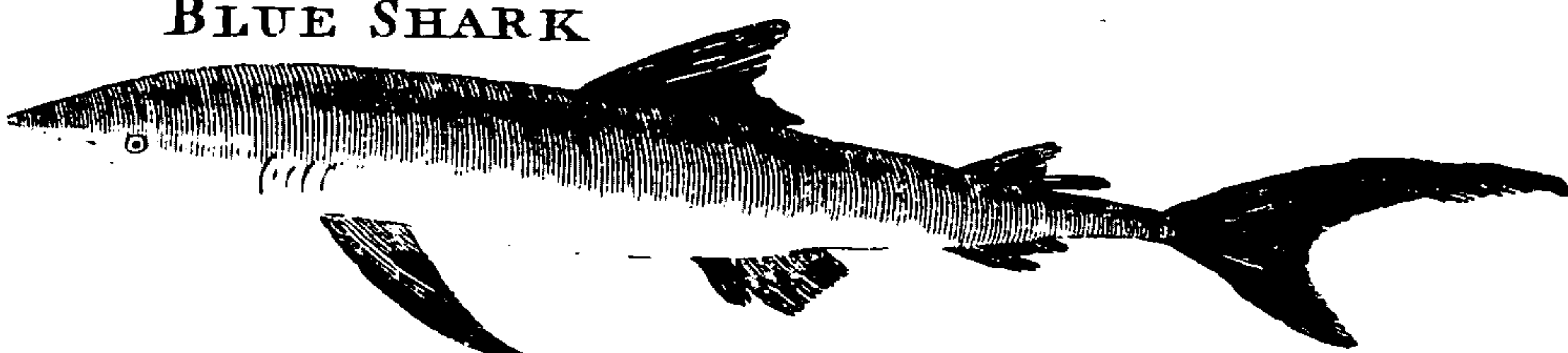
SAW FISH



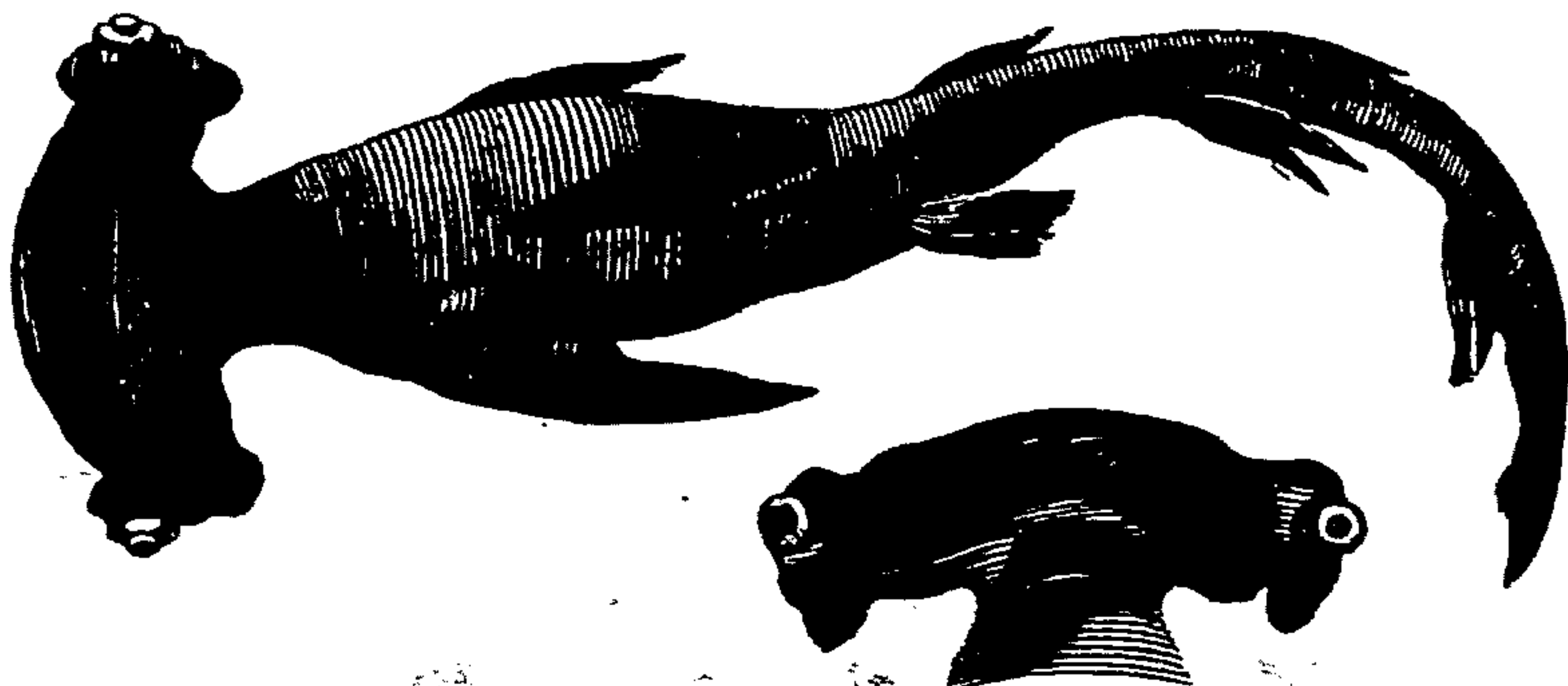
SEA DEVIL or TOAD FISH



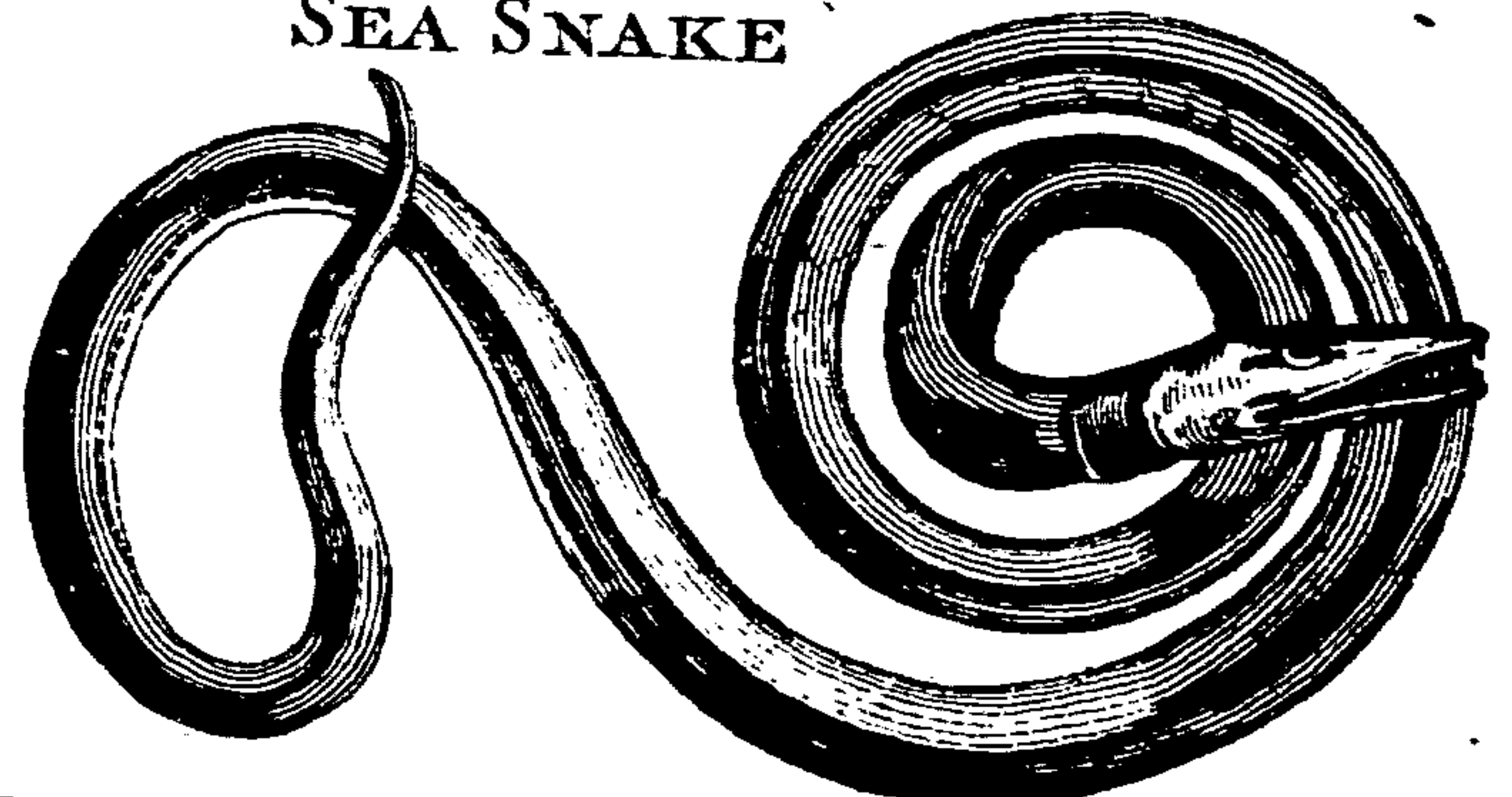
BLUE SHARK



HAMMER HEADED SHARK



SEA SNAKE



lour and rounded; and, instead of the ventral fins, there are two minute spines. The back and sides are of a deep olive colour, and the belly is whitish: the tail is rounded, and of a yellow colour.

The VIVIPAROUS BLENNY.

This species is generally about a foot in length, and of an eel-like form: the skin is smooth and slippery. The back and head are of a yellowish brown, stained with black strokes: the sides are a little lighter, and the belly of a dirty white. It has two small beards at the nostrils, the jaws are rough, and the covers of the gills are open. It is viviparous, as may be imagined from the name, and brings forth two or three hundred young at a time. Their season of bringing forth, is a little after the depth of winter. Before Midsummer, they quit the bays and shores, and retire into the deep, where they are usually taken. They are a coarse fish, and but little esteemed as food.

NATURAL HISTORY of the SEA GUDGEON, or ROCK FISH.

IT is a soft slippery fish, of a slender form, and about six inches in length. It is covered with small rough scales. It is variegated with a mixture of white, yellow, brown, and other colours, interspersed with black spots; there are also transverse streaks of an orange colour. The head is rather large, the cheeks inflated, and the mouth is armed with a double row of rough teeth. The ventral fins coalesce, and form a sort of funnel, having the appearance of a double fin in the middle of the breast: this enables them to stick close to the rocks, from whence they have obtained the name of the Rock Fish. The eyes are small and yellow, looking upwards, and placed pretty near each other. The tail is rounded at the end. This fish is often taken on the coast of Cornwall, and is common in the fish-markets of Venice. The flesh is fat, tender, and delicate.

NATURAL HISTORY of the BULL-HEAD, or MILLER'S THUMB.

THIS species is very common in all our clear brooks: it is about four or five inches in length, with a large broad depressed head of a roundish shape. The gill fins are round, and notched on the circumference. The eyes are small; the iris of the eyes is yellow: the teeth are very minute, and placed in the jaws and the roof of the mouth. The body grows slender towards the tail, and is very smooth. At the beginning of the cover of the gills, on each side, there is a crooked prickle. The colour of this fish is as disagreeable as its form; being dusky, mixed with a dirty yellow: the belly is whitish. It usually lies at the bottom of a stream, either on the gravel, or under a stone: it forms a hole in the gravel, where it deposits its spawn, and quits it with great reluctance. It feeds on water insects.

NATURAL HISTORY of the POGGE.

THIS fish seldom exceeds five inches and an half in length, and very seldom arrives even at that size: it has a triangular depressed head, which is about two inches broad, and very bony and rugged. The end of the nose is armed with four short upright spines, and on the throat are a number of short white beards. The teeth are very minute, and situated in the jaws. The body, which is octagonal,

is covered with a number of strong bony crusts, divided into several compartments; the ends of which project into a sharp point. It is covered all over with bony scales, in the middle of each of which there is a hooked tubercle, which makes the fish appear full of angles. The Pogge is very common on most of the British coasts.

NATURAL HISTORY of the FATHER LASHER.

THIS is also called the sea-scorpion: it is no uncommon fish on the rocky coasts of this island: it lurks under stones, and will take a bait. It seldom exceeds eight or nine inches in length, and its form resembles that of a bull-head. Its head is very large, and has a most formidable appearance; being armed with large spines, which it can oppose to any enemy that attacks it; by swelling out its cheeks and gill covers to a very large size. The head is covered with prickles; the body is small, and the belly broad and flat. Above the lateral lines on the back, there are four roughish broad transverse spaces of a blackish colour; but the intermediate spaces are paler. The covers of the gills are connected below, appearing like a mantle thrown over its head and shoulders. The colour of the body is brown, or dusky and white marbled; and sometimes it is stained with red: the belly is of a silvery white. The fins and tail are transparent, sometimes clouded, and the rays are regularly barred with brown. The nose, and the face, contiguous to the eyes, are furnished with short sharp spines: the covers of the gills are terminated by exceeding long ones, which are very strong and sharp-pointed. The mouth is large, and the jaws are covered with rows of very small teeth; the roof of the mouth is furnished with a triangular spot of minute teeth. This species abounds in the Newfoundland seas; and on the coast of Greenland, in deep water near the shore. It is a principal food of the natives, and the soup made of it, is said to be both agreeable and wholesome. It will live a considerable time out of the water. Its food is shrimps, sea insects, and the young fry of fish.

NATURAL HISTORY of the DOREE, or GILT FISH.

IT has a broad compressed body, not much unlike that of a flounder; but it swims erect. The head is very large and compressed, and the mouth is extremely wide. The colour of the sides is olive, with a large round black spot on each; by which it may be distinguished from other fish of this kind. In short, the form of this fish is hideous; the body is oval, the eyes large, and the irides yellow. The lateral line is very much distorted, sinking at each end, and rising near the middle of the back. The first dorsal fin consists of ten strong spiny rays, with long filaments reaching far beyond their ends. The second, which is placed near the tail, consists of twenty-four soft rays; the middlemost of which are the longest. The pectoral fins have fourteen rays, and the ventral seven: it has also two anal fins. The tail is round at the end, and consists of fifteen branched rays. They never grow to a great size; one of the weight of twelve pounds being considered as a very large fish. It is called the Doree, or Gilt Fish, on account of its shining appearance when alive.

It was very long before this fish attracted our notice as an edible one: the vulgar prejudices on account of its deformity, deterred our ancestors from venturing to eat it; but that judicious actor and bon

vivant, Mr. Quin, has effectually established its reputation; and added a most delicious repast to our table.

This fish is found not only in the southern seas of this kingdom, but also on the coast of Anglesea. Those of the largest size are taken on the Bay of Biscay, off the French coasts: they are also very common in the Mediterranean.

NATURAL HISTORY of the HOLLIBUT.

THIS is the largest of all flat-fish in these parts of the world; it greatly exceeds a turbot in size, and is of a longer make. Some have been taken in our seas, weighing from one to three hundred pounds. In the seas of Newfoundland, Greenland, and Iceland, they are found much larger.

The Hollibut, with respect to its length, is the narrowest of any of this genus, except the sole. It is perfectly smooth and free from spines, either above or below. The colour of the upper part is dusky; that of the lower part of a pure white. The eyes are placed on the right side, or to the left of the mouth: the fins are at a greater distance from the head than in other flat fish. In both the upper and the lower jaws it has a double row of teeth, which are very sharp, and somewhat crooked at the end. It has very sharp prickles on the gills. It swims sideways.

Of all flat fish the Hollibut is the most voracious. They are common in the London markets; where they are exposed to sale cut into large pieces. They are by some supposed equal to the turbot, but in general they are thought very coarse eating; excepting the part which adheres to the side fins, which is extremely delicious.

NATURAL HISTORY of the PLAICE.

THE back of this fish is of a dirty olive colour, or brown, and speckled with roundish red spots; of which there are some also on the fins. The belly is white. The eyes are on the right side, to the left of the mouth; and, at the upper edge of the coverings of the gills, there are seven bony tubercles, or warts; the fifth from the eyes being the highest and the largest. There is a row of teeth in each jaw, and a cluster of teeth on the palate. One of the nostrils is seated on the upper side, near the eyes; and the other on the lower side under the eyes. The tail is long, and roundish at the end.

These fish are very flat. They are common on most of our coasts, and are sometimes taken of the weight of fifteen or sixteen pounds: but they are very rarely found of that size, one of seven or eight pounds being reckoned a large fish. The largest are taken off Rye, on the coast of Suffex, and also off the Dutch coasts. They spawn about the beginning of February.

NATURAL HISTORY of the DAB.

THIS fish is somewhat thicker than the plaice, but smaller. It is found with the other species, but it is less common. The scales are small and rough on the edges; in which it differs from the plaice, as well as in not having any tubercles near the head, nor red spots. But the eyes are situated like those of the plaice; and the colour on the upper part is of a dirty olive, with a reddish cast, and some spots of a dusky yellow. The mouth is of a middle size, and has a row of teeth in each jaw. The lateral line is very crooked at the beginning,

but afterwards goes quite straight to the tail. The lower part of the body is white. This fish is best in season during the months of February, March, and April: they spawn in May and June, and remain flabby and watery all the rest of the summer. They are superior in goodness to both the plaice and flounder.

The SMEAR DAB.

It is about eighteen inches long and eleven wide, between fin and fin, on the widest part. The head appears very small; the dorsal fin beginning very near its mouth, and extending almost to the tail. The eyes are very near each other, and the mouth is full of small teeth. The back, which is covered with small smooth scales, is of a light brown colour, spotted obscurely with yellow. The belly is white, and marked with five large dusky spots. The flesh of the Smear Dab is equal in goodness to that of the Common Dab.

NATURAL HISTORY of the FLOUNDER.

THE Flounder is easily distinguished from the plaice, or any other fish of this genus, by a row of sharp small spines or prickles, that surrounds its upper sides, and are placed just at the junction of the fins with the body. Another row marks the side-line, and runs half way down the back. The scales, which are exceeding small, stick so close to the skin, that there seems to be no roughness. This fish has a small mouth, a narrow tongue, and a row of teeth in each jaw. It greatly resembles the plaice in shape; but the body is somewhat longer and thicker. It inhabits every part of the British sea, and even frequents our rivers which communicate with the sea; and though it does not grow large in our fresh-water streams, it is reckoned sweeter than those which live in the ocean. It does not grow so large as the plaice, and is hardly ever seen to exceed six pounds in weight. The colour of the upper part of the body is a pale brown, and frequently marked with a few obscure spots of dirty yellow: the belly is white.

Flounders are in season all the year, except in June and July, which is their time of spawning, and then they are sick and flabby, and infested with worms which breed on their backs. The flesh is white, soft, innocent, and nourishing; but it is always best when it is most firm. The taste of it greatly resembles that of the plaice, from which it differs but little in any respect.

It is the nature of all flat fish to lie and feed at the bottom; some indeed are fond of mud, but the Flounders avoid it as much as possible, delighting to lie on sandy or gravelly bottoms, especially on the declivity of a deep hole, near a bank, and in an eddy.

They may be angled for either with a float or a running bullet, but the latter is preferable. The bullet should rest at least a foot from the hook, that the bait may be at liberty to be put in motion by the water. If you use a float, let it lie flat on the water, and when you perceive it to move along slowly, and soon after become upright, then strike, and you will be sure of your prey. But always remember, that he is some time in sucking the bait into his mouth before he gorges it.

The best baits are red worms, or very small marsh worms put on a small hook. You should bait the ground with a handful of small red worms cut in two pieces. They may be angled for all the day, but early in the morning is the best time. He likewise takes earth bobs very well.

In the hot months, there are great quantities caught with the fluke-rake. The method is to get one

THE HERBERTS

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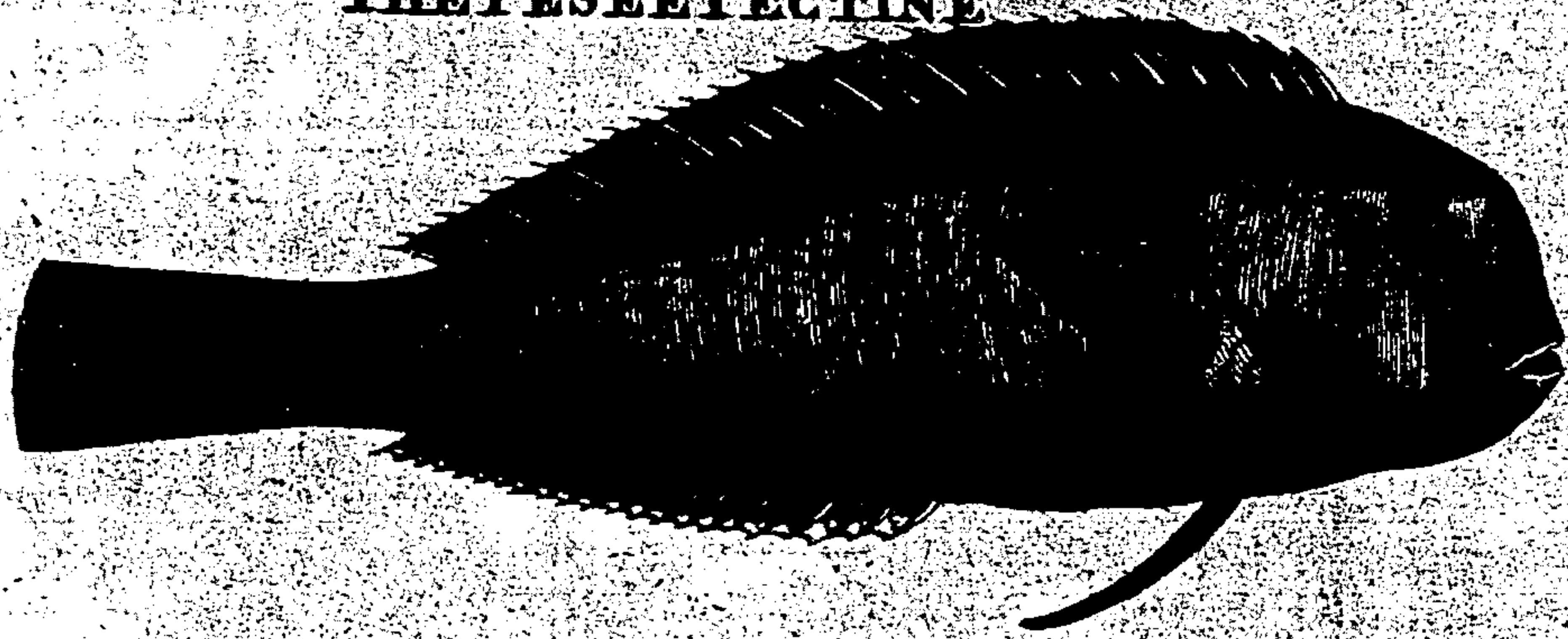
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THE HERBERTS

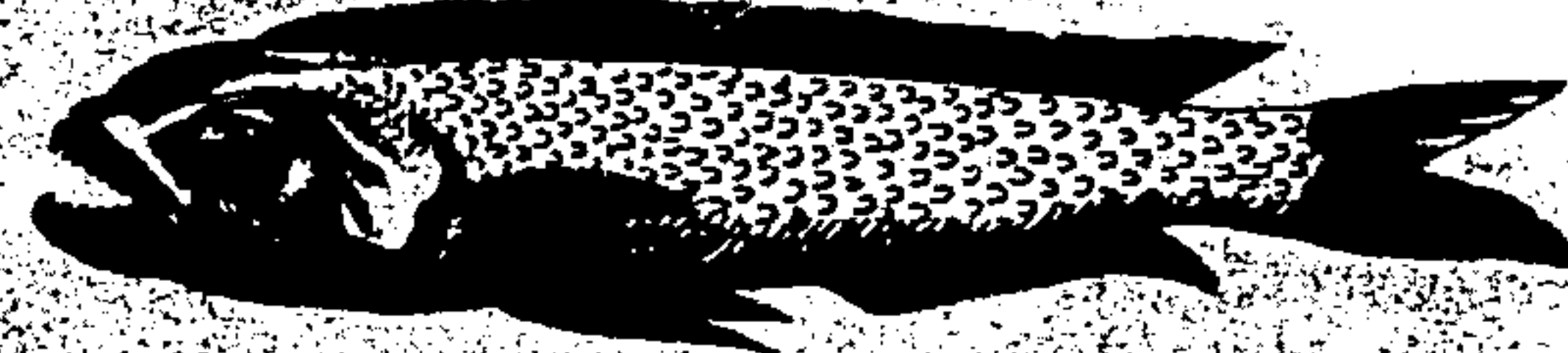
THE HERBERTS

FISHES.

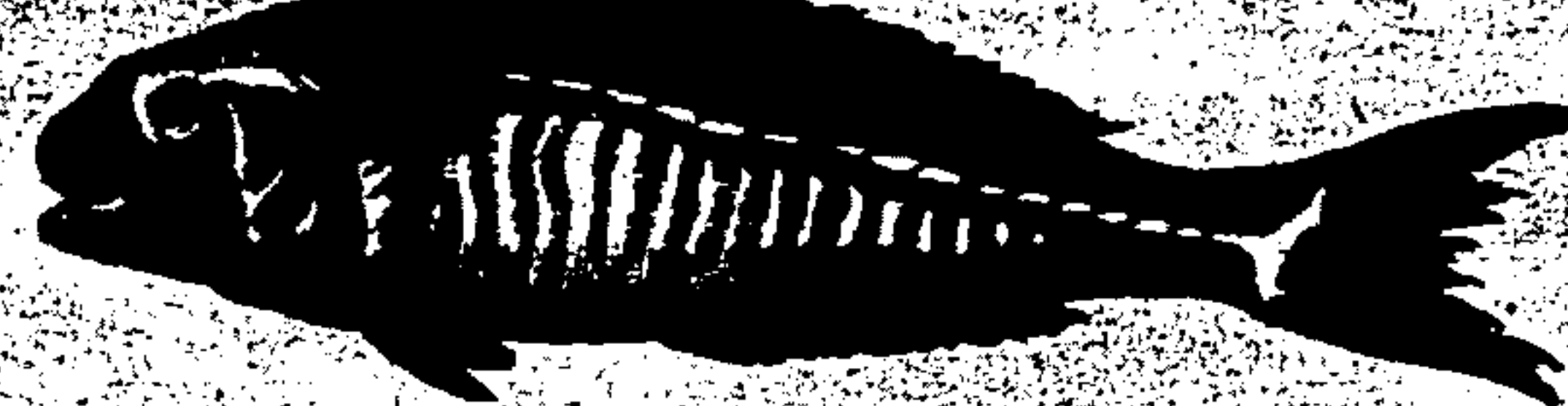
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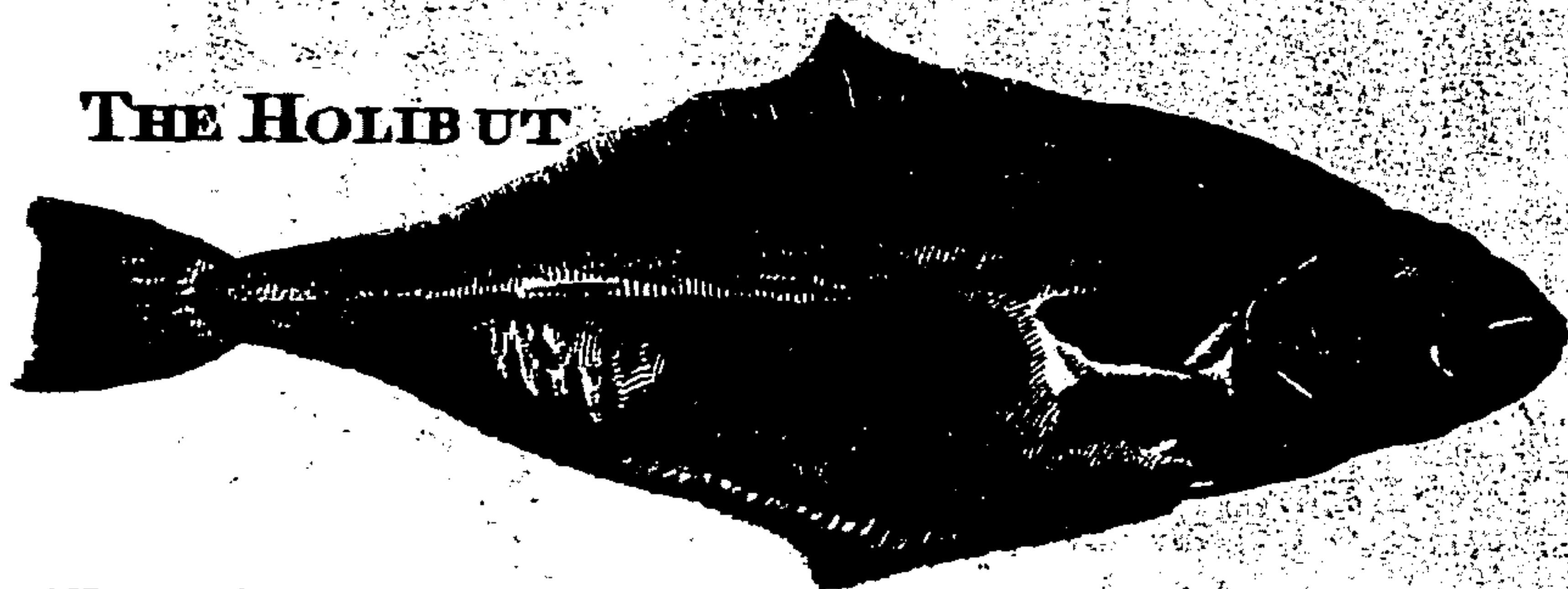
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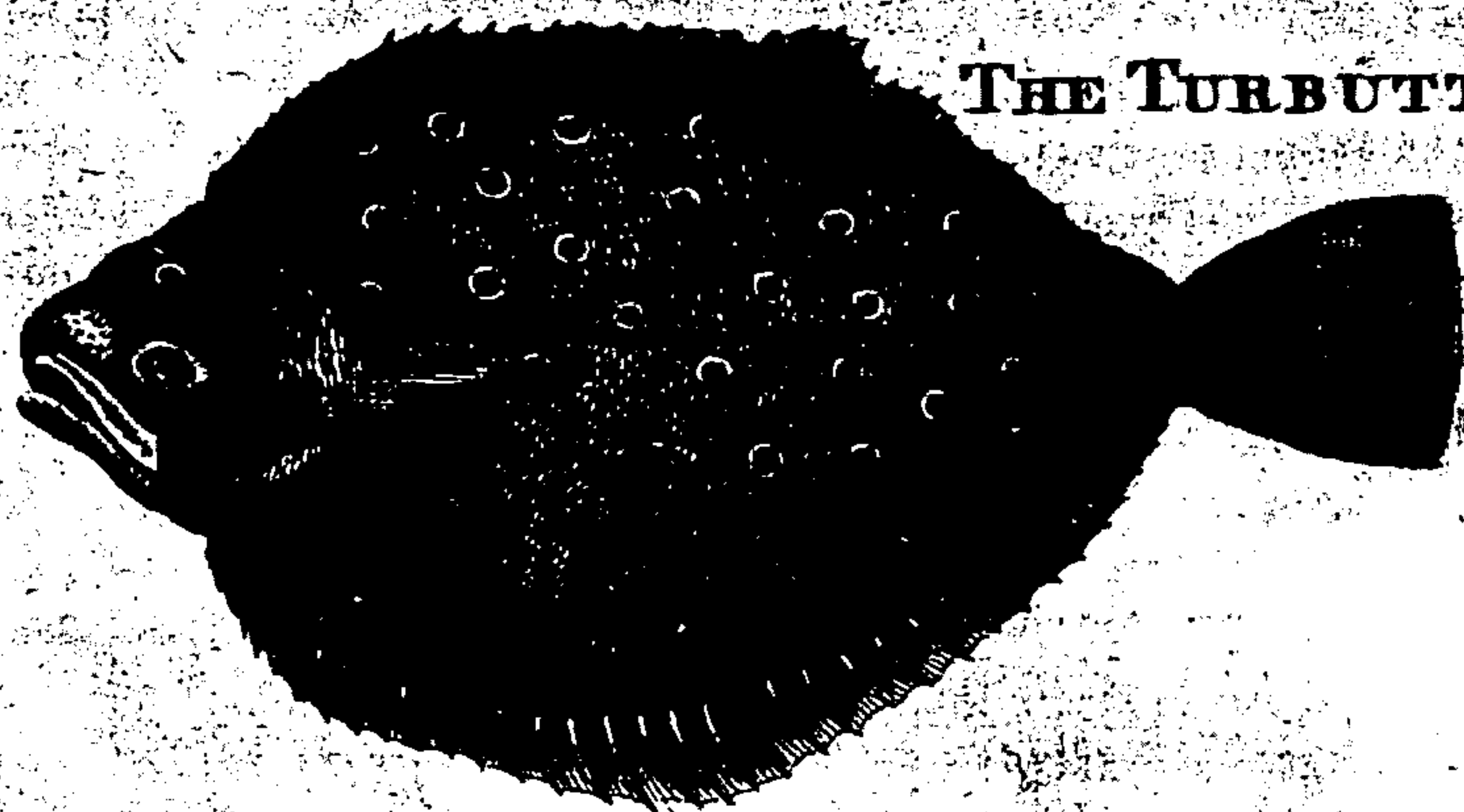
THE AMMODITES or SAND EEL



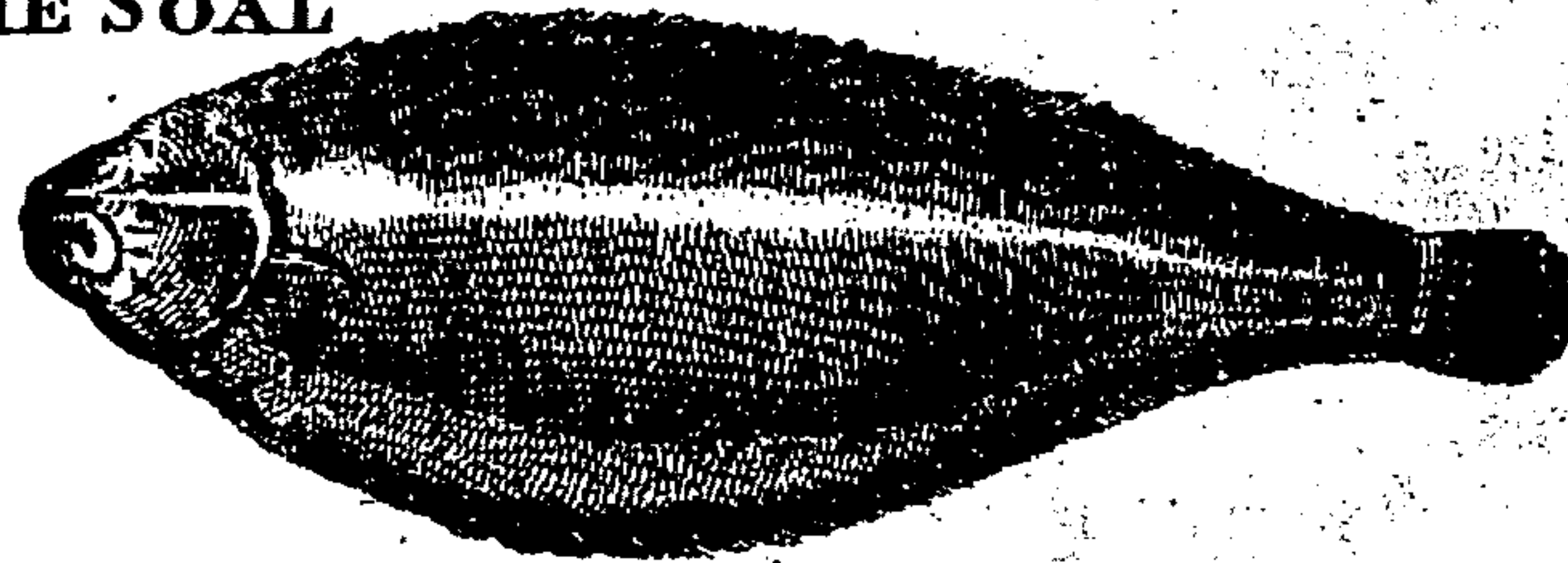
THE HOLIBUT



THE TURBUTT



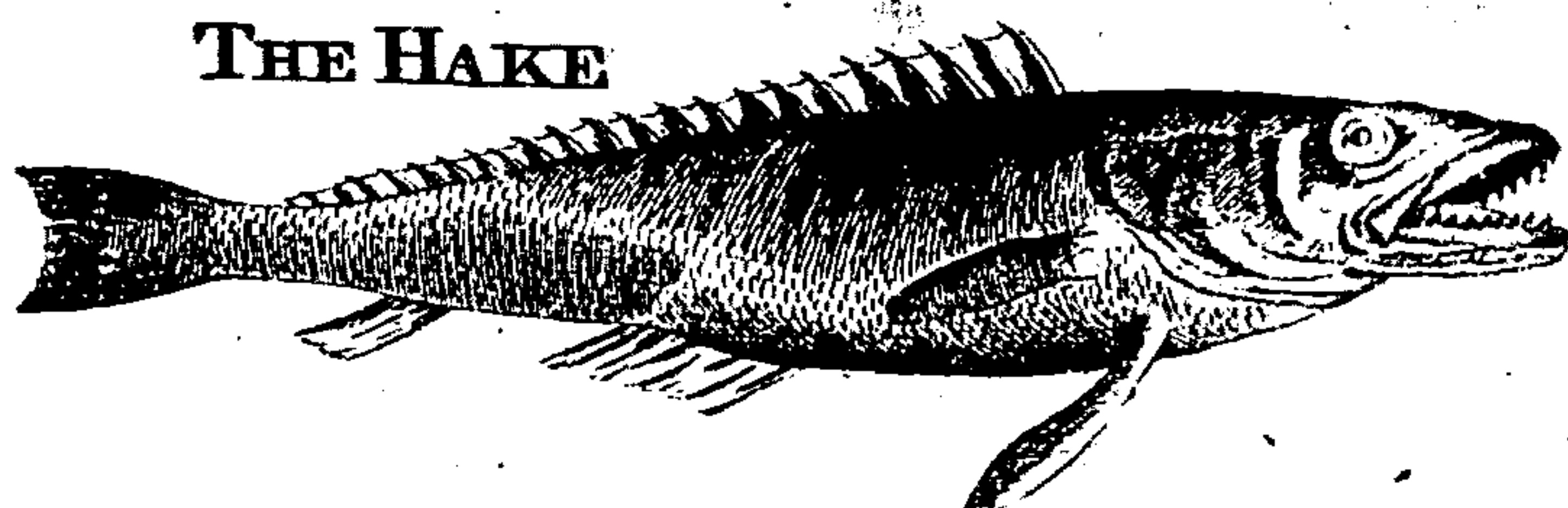
THE SOAL



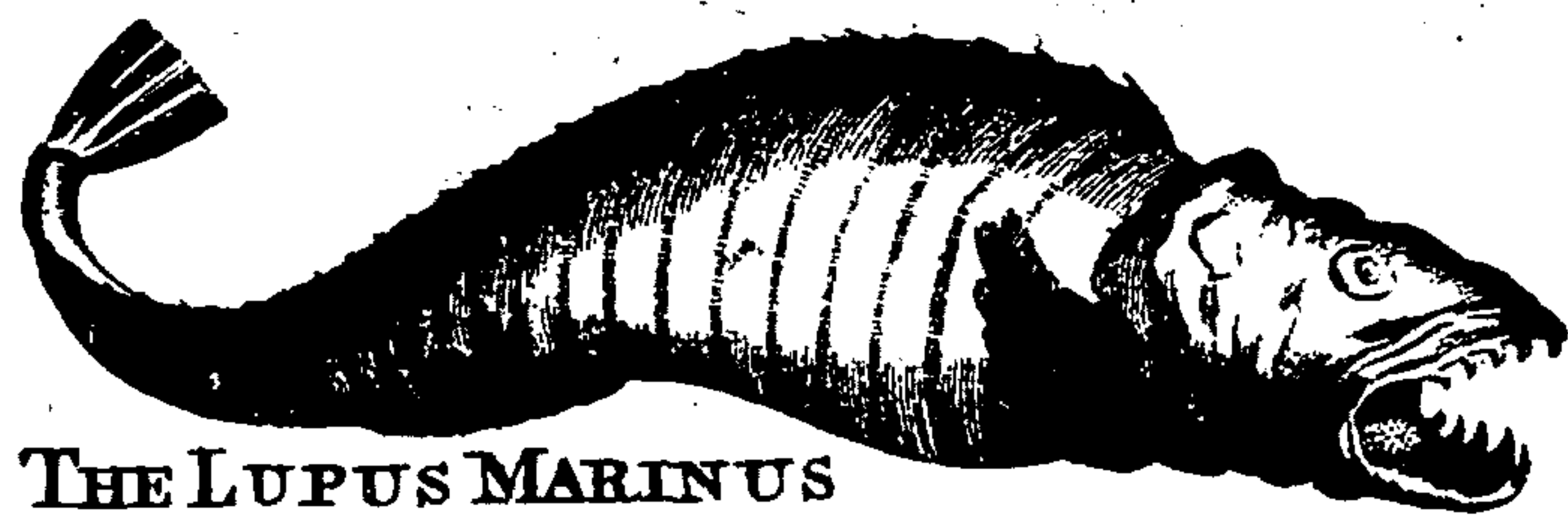
ASELLUS VIRESCENS



THE HAKE



THE COLE FISH



THE LUPUS MARINUS
or SEAWOLF

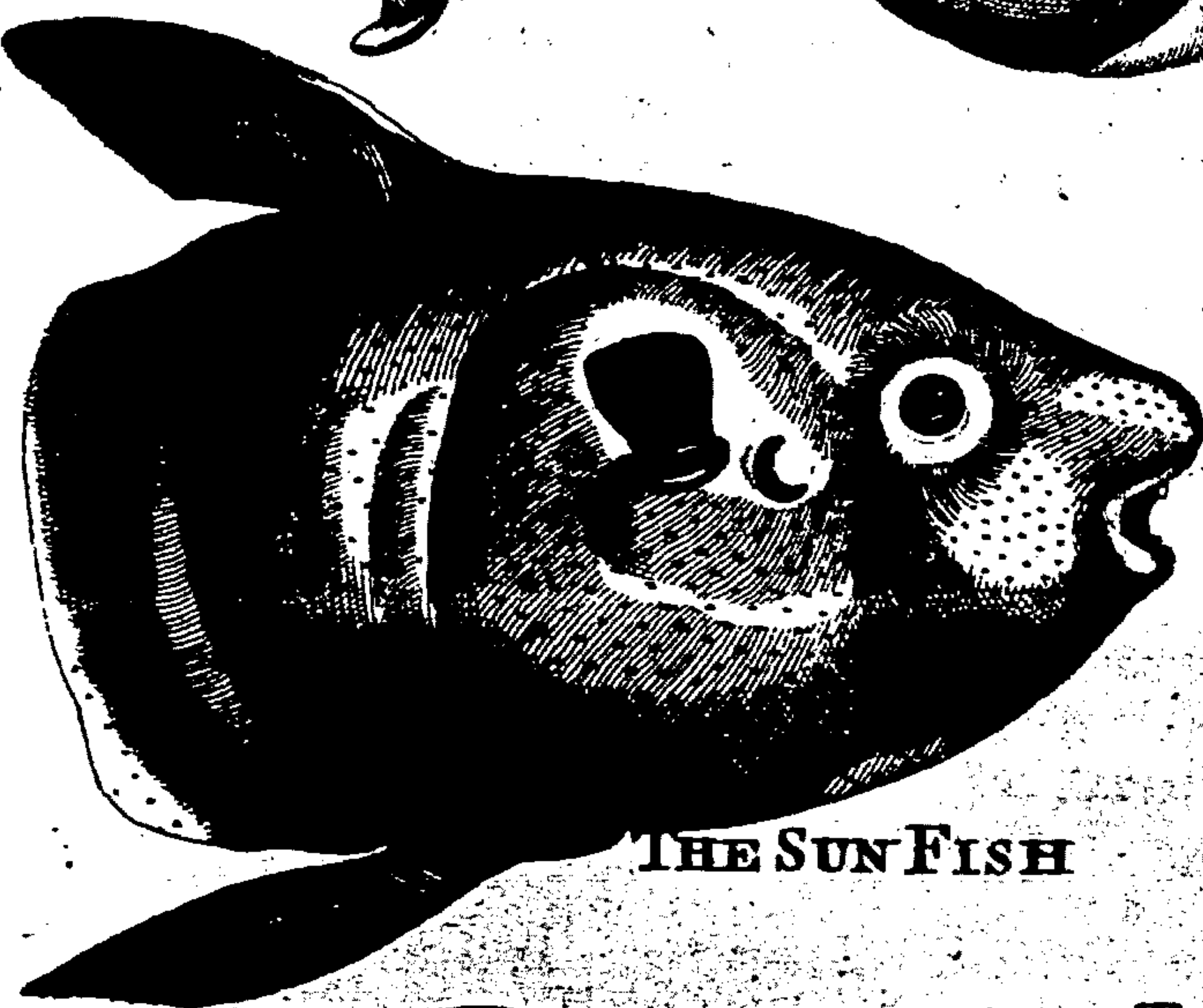


THE SEA GUDGEON

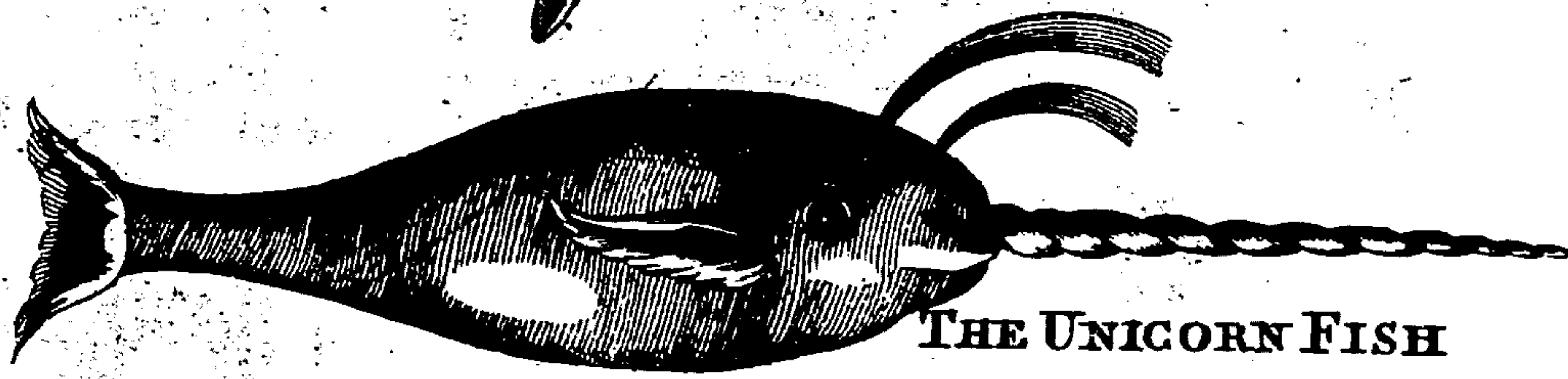
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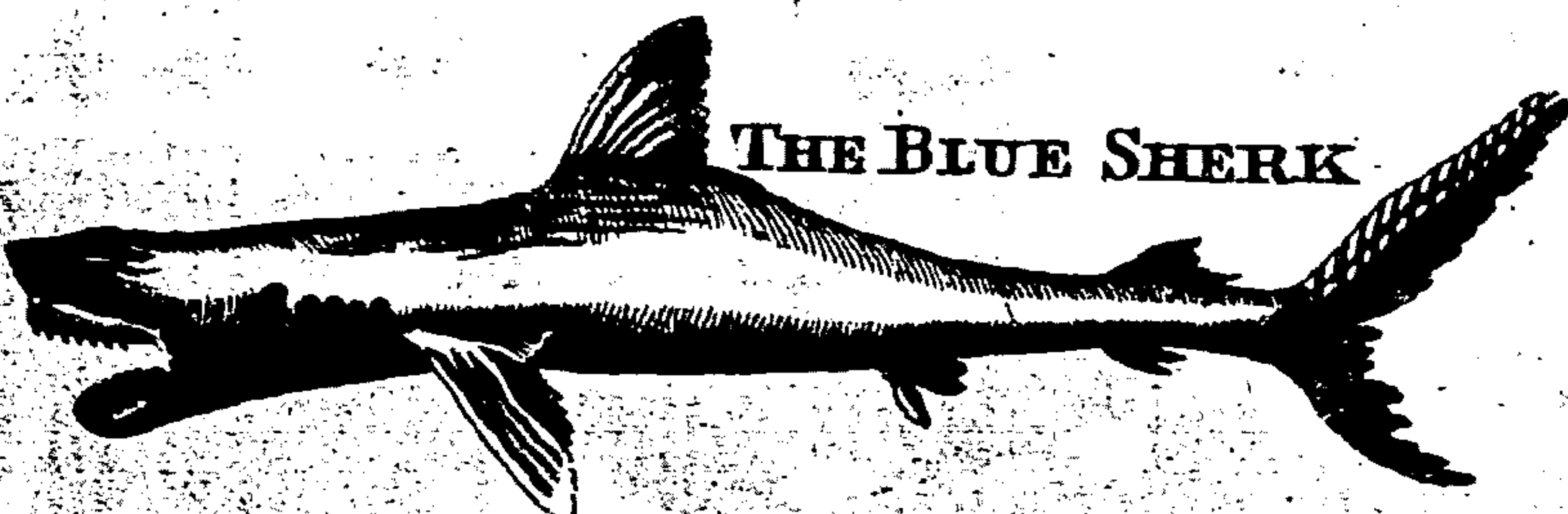
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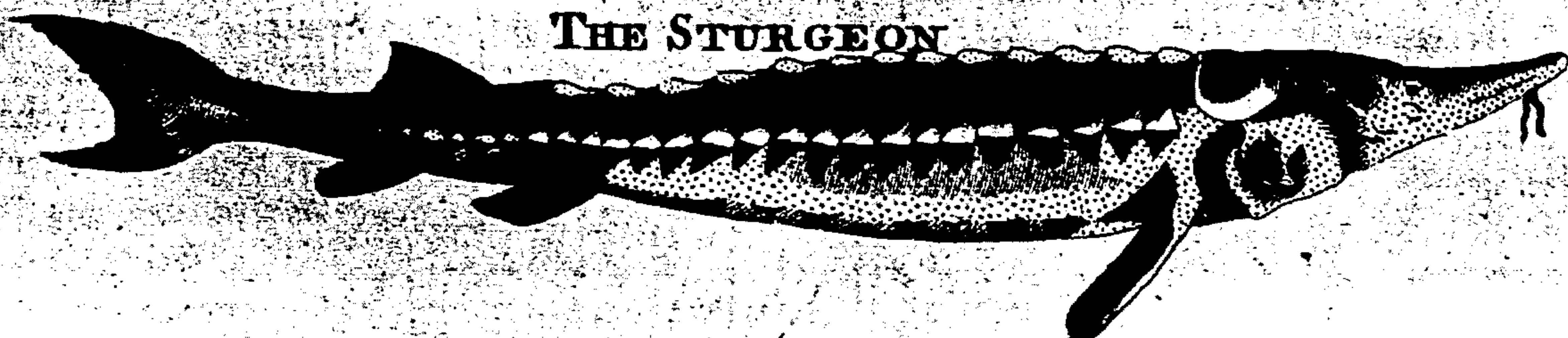
THE SUN FISH



THE UNICORN FISH



THE BLUE SHERK



THE STURGEON

one about two yards long, and go to the shallow parts of the water where it is the most sandy, and as you go along, keep thrusting the rake into the sand, which you may easily do by setting one foot upon the frame, and when you have caught one you will easily perceive it by the rake's grasping as the forks enter his back. This method is only used in the tide's way after it is gone down.

NATURAL HISTORY of the SOLE.

THIS is a longish flat fish, resembling the sole of a shoe in shape, from whence it has its name. It is found on all our coasts, but those on the western shores are much superior in size to those of the north. On the western coasts they are sometimes taken of the weight of five or six pounds; but towards Scarborough they seldom exceed one pound; and one of two pounds is reckoned an uncommon fish. The upper part is of a dark ash colour, and the lower part white: it is covered with rough scales. The lateral line passes directly from the head to the tail, thro' the middle of both sides. The corners of the mouth are rough, having a kind of small bristles or hairs: the body is surrounded with short fins, which begin near the eyes, and extend almost to the tail. The eyes are small, round, and covered with a loose skin: the irides are yellow, and the pupils of the eye are of a bright sappharine colour: the tail is rounded at the end.

The Sole is a fish of a very delicate flavour; but the large Soles are much inferior in goodness to the small ones. The chief fishery for them is at Blixham, and in Torbay. About twelve or fourteen years ago, Mr. Blake, a gentleman of great probity and fortune, took indefatigable pains to reduce the price of this delicious fish, by contriving a method of bringing them to London by land-carriage; and though his scheme did not meet with that success it merited, and was opposed by the whole trade of mercenary fishmongers, yet the plan appears now to be in a great measure adopted by the fishmongers themselves; and Soles are now to be purchased of them at about half the price they were usually sold at, before Mr. Blake projected his plan.

By the antient laws of the Cinque Ports, a penalty was inflicted upon every person who should take Soles from the first of November to the fifteenth of March; also upon every person who should fish for them from sun-setting to sun-rising.

There is a species called the smooth Sole, which is very scarce, and found chiefly about Cornwall. It is extremely thin, white, and transparent; and, on that account, is sometimes called the Lantern Fish.

NATURAL HISTORY of the TURBOT.

IN the northern part of England this fish is called a Brett: it grows to a very large size; and sometimes, though very rarely, is found to weigh thirty pounds. It is the largest of all this kind, the holibut excepted. These fish are taken chiefly off the north coast of England, and others off the Dutch coast; but we believe the last has, in many instances, more credit than it deserves for the abundance of its fish. They have no scales, but a rough spotted skin, full of exceeding small prickles, placed without order on the upper part of the body.

The large Turbots, and several other kinds of flat fish, are taken by the hook and line, for they lie in deep water: the method of taking them in wares, or staked nets, is too precarious to be depended on for the supply of our great markets, because it is by meer accident that the great fish stray into them.

Mr. Pennant furnishes us with the following method of fishing for Turbot, cod, ling, scates, &c. The inhabitants of many of our fishing coasts, says he, especially those of the north part of North Wales, are unacquainted with the most successful means of capture: for their benefit, and perhaps that of other parts of our island, we shall lay before them the method practised by the fishermen of Scarborough.

When they go out to fish, each person is provided with three lines. Each man's lines are fairly coiled upon a flat piece of wicker work; the hooks being baited, and placed very regularly in the center of the coil. Each line is furnished with fourteen score of hooks, at the distance of six feet two inches from each other. The hooks are fastened to the lines upon snoods of twisted horse hair, twenty-seven inches in length.

When fishing there are always three men in each coble, and consequently nine of these lines are fastened together, and used as one line, extending in length near three miles, and furnished with two thousand five hundred and twenty hooks. An anchor and a buoy are fixed at the first end of the line, and one more of each at the end of each man's lines; in all four anchors, which are commonly perforated stones, and four buoys made of leather or cork. The line is always laid across the current. The tides of flood and ebb continue an equal time upon our coast, and when undisturbed by winds run each way about six hours. They are so rapid, that the fishermen can only shoot and haul their lines at the turn of tide; and therefore the lines always remain upon the ground about six hours. The same rapidity of tide prevents their using hand-lines; and therefore two of the people commonly wrap themselves in the sail, and sleep while the other keeps a strict look out, for fear of being run down by ships, and to observe the weather. For storms often rise so suddenly, that it is with extreme difficulty they can sometimes escape to the shore, leaving their lines behind.

The coble is twenty feet six inches long, and five feet its extreme breadth. It is about one ton burthen, rowed with three pair of oars, and admirably constructed for the purpose of encountering a mountainous sea: they hoist sail when the wind suits.

The five men boat is forty feet long and fifteen broad, and of twenty-five tons burthen; it is so called, though navigated by six men and a boy, because one of the men is commonly hired to cook, &c. and does not share in the profits with the other five. All our able fishermen go in these boats to the herring-fishery at Yarmouth the latter end of September, and return about the middle of November. The boats are then laid up until the beginning of Lent, at which time they go off in them to the edge of the Dogger, and other places, to fish for Turbot, cod, ling, scates, &c. They always take two cobbles on board, and when they come upon their ground, anchor the boat, throw out the cobbles, and fish in the same manner as those who do go from the shore in a coble, with this difference only; that here each man is provided with double the quantity of lines, and instead of waiting the return of tide in the coble, return to the boat and bait their other lines; thus hawling one set, and shooting another every turn of tide. They commonly run into harbour twice a week to deliver their fish. The five-men boat is decked at each end, but open in the middle, and has two large lug sails.

The best baits for all kinds of fish is fresh herring cut in pieces of a proper size; and notwithstanding what has been said to the contrary, they are taken here at any time in the winter, and all the spring.

spring, whenever the fishermen put down their nets for that purpose. The five-men boats always take some nets for that end. Next to herrings are the lesser lampreys, which come all winter by land-carriage from Tadcaster. The next baits in esteem are small haddocks cut in pieces, sand-worms, muscles, and limpets (called here fledgets,) and lastly, when none of these can be had, they use bullock's liver. The hooks used here are much smaller than those employed at Iceland and Newfoundland. Experience has shewn, that the larger fish will take a living small one upon the hook, sooner than any bait that can be put on; therefore they use such as the small fish can swallow. The

hooks are two inches and an half long in the shank, and near an inch wide between the shank and the point. The line is made of small cording, and is always tanned before it is used.

Turbots, and all the rays, are extremely delicate in their choice of baits. If a piece of herring or haddock has been twelve hours out of the sea, and then used as bait, they will not touch it.

Such is the manner of fishing for those fish that usually keep near the bottom on the coasts of England; and Duhamel observes, that the best weather for succeeding, is half calm, when the waves are just curled with a silent breeze.

C H A P. IV.

Containing the NATURAL HISTORY of the PEARL, the GILT HEAD, the SEA-BREAM, the OPAH, the WRASSE, the COOK, the PEARCH, the BASS, the RUFF, the STICKLEBACK, the MACKREL, the TUNNY, the SCAD, the GURNARD, the PIPER, the TUB FISH, the LOACH, the SALMON, the GREY, the SALMON TROUT, the TROUT, the SAMLET, the CHAAR, the GRAYLING, the SMELT, the GUINIAD, the PIKE, the ARGENTINE, and the MULLET.

NATURAL HISTORY of the PEARL.

THE Pearl differs from others of this kind, in having a scaly body, and from a place in the prickles, which surround the roots of the fins. The upper part of the body is of a deep brown, marked with spots of dirty yellow: the lower part is of a pure white. Its eyes are on the left side, to the right of the mouth; and are at a greater distance from each other than those of the plaice. These fish are frequently brought to the London markets, but they are smaller than the turbot, and inferior in goodness.

NATURAL HISTORY of the GILT-HEAD, or GILT-POLL.

IT is a broad fish, compressed on the sides, and somewhat resembling a bream. It grows to the length of eight or ten inches, and to the weight of ten pounds. The back is sharp, and of a dusky green colour. Between the eyes is an arched stripe, resembling a crescent, of a gold colour; the horns of which point towards the head; and from this semilunar gold coloured spot, the Gilt-Head takes its name. It has usually a black spot at the upper corner of the cover of the gills, and another of a purple colour below them. The teeth in each jaw are oblong and roundish. The tail is very much forked.

This is one of those fish that haunt deep waters on bold rocky shores: it feeds principally on shell-fish, which it comminutes with its teeth before it swallows. It is frequently seen in the markets of Rome, Genoa, and Venice; and is sometimes taken on our coasts. It is but a coarse fish; and was held in very little esteem by the Romans, except it had fed on the Lucrine oyster.

No praise no price a gilt-head e'er will take,
Unfed with oysters of the Lucrine Lake.

MARTIAL, lib. iii. ep. 90.

The SEA BREAM.

This species grows to a size equal to that of the gilt-head: its form and the figure of the teeth are also much the same. The upper part of the body is black, the sides are of a lighter colour, and the

belly is of a silver white. The eyes are large, and the covers of the gills resemble those of a salmon. It has only one fin on the middle of the back, which extends its whole length; and another fin, at the bottom of the belly, reaches almost from the vent to the tail. The scales are very large, and the tail is forked. This fish is not very common in England; the flesh of it cuts red, and has a very delicate taste, far surpassing either the river or the pond Bream. It is frequently caught in rock-fishing, and by the salmon fishermen in the Mersey.

There is a variety of the Sea Bream, whose body is entirely red.

NATURAL HISTORY of the OPAH.

THE Opah is a beautiful, and an uncommon fish, weighing about seventy or eighty pounds, and somewhat like the sea-bream in shape. The length is about three feet and an half; the breadth from back to belly almost two feet; and the thickness, from side to side, does not exceed six inches. In proportion to the size of the fish, the mouth is small, forming a square opening, and the jaws destitute of teeth. The tongue is rough, and thick set with beards or prickles, pointing backwards, so that any thing may pass down, but cannot easily return back. The eyes are very large, covered with a membrane, and shining with a glare of gold. The body diminishes very small to the tail, which is forked, and expands twelve inches. The fins and tail of this fish are of a fine scarlet; but the rest of the body is beautiful beyond description. It is smooth, and covered with almost imperceptible scales. The colour of the upper part is a kind of bright green, variegated with whitish spots, and enriched with a shining golden hue, resembling, in a great degree, the splendour of the peacock's feathers; this gradually vanishes in a bright silver colour; and the gold begins again to predominate near the belly, in a lighter ground than on the back.

NATURAL HISTORY of the WRASSE, or OLD WIFE.

THE shape of this fish resembles that of the river tench; it grows to the weight of four or five pounds, and is covered with large scales.

This

These fish vary infinitely in colour; but in general are reddish, and most beautifully striped, especially about the head, with the richest colours, such as red, blue, and yellow. We must not therefore multiply the species from these accidental tints, but particularly attend to the form which never alters. The snout is oblong, and turns upwards; the lips are thick and fleshy, projecting beyond the jaws; but the mouth is small. The teeth in the jaws are serrated, but not very sharp. The tail is rounded at the end, and is formed of fourteen soft branching rays.

This species is found in deep water, adjacent to the rocks, and is to be met with in the British and Irish seas. It is more agreeable to the sight than to the taste. The Welch call it *gurach*, or the old woman; the French call it *la veille*, or the old woman; and the English give it the name of Old Wife. It is difficult to assign a reason why they all so exactly agree in these synonyms.

The LESSER GREEN WRASSE.

The body of this species is entirely green, except that some of them have bluish spots about the belly; and the body is broader and thicker than that of others of this kind. The fins are somewhat spotted, and it has a purple tubercle near the vent. The painted Wrasse, the black Wrasse, the striped Wrasse, and the variegated Wrasse, are varieties of this species.

NATURAL HISTORY of the COOK.

THIS is a scaly fish, and does not grow to any great size. The back is purple and dark blue, and the belly yellow. They are sometimes taken in great plenty on the Cornish coasts.

NATURAL HISTORY of the PEARCH.

THE Perch was much esteemed by the Romans, and is now equally admired as a firm and delicate fish; and the Dutch are particularly fond of it when made into a dish called *water souchy*. This fish delights in deep holes, and gentle streams: it is extremely voracious, and a very eager biter: if an angler meets with a shoal of them, he is almost sure of taking every one. A full-grown Perch is about twelve or fourteen inches long, tho' they are sometimes found to exceed sixteen; but this is an extraordinary size. The body is deep, the scales very rough, and the back very much arched. The iris of the eye is of a yellow or gold colour; the mouth is wide; and the teeth are small, disposed in the jaws and on the roof of the mouth: the edges of the covers of the gills are serrated; and on the lower end of the largest is a sharp spine. The colours of the Perch are beautiful: the back and part of the sides are of a dark green, marked with five broad black bars, pointing downwards: the belly is white, tinged with red: the ventral fins are of a bright scarlet; and the anal fins and the tail are of the same colour, but somewhat paler. The tail is a little forked.

It is said, that the pike will not attack this fish, being fearful of the spiny fins which the Perch erects at the approach of the former. With respect to large fish, this opinion may be well founded; but it is well known the small ones are the most alluring bait that can be offered for the pike: it is probable the fins are then too soft to do him any injury.

The Perch is very tenacious of life, and may be carried forty or fifty miles in dry straw, and yet survive the journey. The flesh of it is very wholesome,

and easy of digestion. The bones of the head are used in medicine, and, when pulverized, have the same virtue as other absorbent powders.

There is a very singular variety of Perch in a lake called Llyn Raithlyn, in Merionethshire, in which the lower part of the back-bone, next the tail, is strangely distorted.

The liver of the Perch is usually thrown away, because it is apt to be measly. These fish spawn but once a year, and that is in the latter end of February. Some think the male is to be distinguished from the female, by the fins being of a deeper red.

The most natural places for this fish are rivers, and yet it will live and even thrive when shut up in a pond. In the day-time it does not appear to be fond of any particular haunt, because it is almost continually roving about in quest of food, being, as already observed, a very voracious fish; and yet they are more likely to be found under the hollow of a bank, the piles of bridges, stumps of trees, or in a gentle stream of a middling depth. In the night, indeed, they retire to a place of repose, which, if you are so lucky as to discover, early in the morning, you have an excellent chance of taking them all, for they bite very boldly, generally herd together, and the taking of one does not intimidate the rest from falling into the same danger.

It will be to no purpose to angle for this fish before the mulberry-tree begins to bud; that is, before the spring is so far advanced as to put the fruit out of danger of being killed by nipping frosts, and for the same reason he always bites best in warm weather; yet, in the midst of summer, he is soonest taken in cool, cloudy, and windy weather, and you may angle for him any time of the day, but you will be more likely to succeed from seven to ten in the morning, and from two till sun-set in the afternoon, or later. In angling for Perch, you need not continue long in the same place, for they usually bite as soon as the bait drops in: you ought to angle at or near the bottom, constantly raising your bait almost to the top, letting it drop gently again. The dog or flag-worm is an excellent bait.

The most likely baits are worms, minnows, and small frogs; but the most sure killing is the brandling-worm, two upon the hook at a time, well scoured in moss, unless it be in the Mole, and some other rivers that run into the Thames, where minnows are scarce. But they are not very nice in the choice of their food, and have frequently been caught with a fly in fishing for trout; and sometimes a brace at a time have been caught in angling for gudgeons with two hooks baited with red worms. They will take their own gills very well. They take the bait best within a foot of the ground, and swallow it instantly, because they have the largest mouth, in proportion to their size, of any other fish. However, when you fish with a minnow, or frog, they should have a little more time when you strike, than when you bait with a worm.

The Perch struggles hard for his life, and consequently yields the angler much diversion: when a Perch is pursued by the pike, he sets up his prickly fins, and often saves himself from being swallowed. If you find that you have a bite from a large one, give him a little time to gorge the bait; but if it is a small one, you may strike instantly, especially if your bait be a brandling. He will bite at a worm, a minnow, or a little frog; of which you may find many in hay-time: of worms, the lob-worm, or the brandling, is taken to be the best, being well scoured in moss or fennel; and the worm that lies under cow-dung, with a bluish tail. He will also take the red-worm, and the dew-worm.

When the Perch bites, be sure you give him time enough to pouch the hook, for scarce any angler ever gave him too much. Some, in angling for

Perch,

Pearch, will suffer their bait to touch the ground, especially when they fish with a worm. The turning of the water, or eddy, in a good gravel-scour, is an excellent place for sport. Your tackle should be strong, because, in fishing for Pearch, pikes are often taken. Bait the ground over night with lob-worms cut in pieces.

The following directions in angling for Pearch with a worm, may be worth observing. In March use the red-worm at the bottom. In April the oak-worm, a young frog with its feet cut off, or a red-snail. In May the dock-worm, or the bait that breeds on the osier-leaf, the oak-leaf, and the hawthorn. In June the red-worm with the head cut off, and a cod-bait put before it, or the dor. In July, the large grass-hopper, or dunghill-grub: in August, and the following months, red-worms, or brandlings; at any time two or three gentles.

The Pearch has been often fished for with two hooks and a live minnow with good success. The hooks have been tied to silk, one of which is put through the upper jaw, and the other through the middle of the back. When you bait with a frog, thrust the hook through its leg near the thigh, and when you throw it into the water, keep it from the shore as much as possible, for it will be for making thither as fast as it can.

As the Pearch generally swallows the bait, and as it is difficult to get the hook out of his entrails without breaking the line, it will be necessary to carry an instrument in your pocket, which is called a gorge. It may be made of iron, or wood, about six inches long, and half an inch thick, with a hollow at the extremity. This hollow end you are to thrust down the throat of the fish, till you feel the hook, at the same time keeping your line straight, lest the hook should catch again; when you have disengaged it with this instrument, you may draw them both out carefully together.

Ausonius, says Lemery, reckons the Pearch of the number of those fishes that have a delicious taste. It may be said, in general, that the Pearch has but few gross humours; that it produces many good effects, and but a few bad ones: and the reason is, because this fish lives generally, and out of choice, in pure, clear, and rapid waters, rather than in those that are muddy, and run slowly. Moreover, it feeds upon good food, and is very active, which, also, contributes to make it more delicious and wholesome. It is nourishing, and affords good food, because it contains many balsamic parts, and most pure juice. It is, also, easy of digestion, when middle-aged; for then it is of a middling consistence: when, on the contrary, it is too young, or too old, it is soft and viscous, or else hard, like leather.

NATURAL HISTORY of the BASS.

THE Bass is a strong, active, and voracious fish: it is frequently called the wolf-fish, on account of its voracity. It will grow to the weight of fifteen pounds, and its shape resembles that of a trout, except that it has a thicker head. The mouth is large: the teeth, which are situated in the jaws, are very small. In the roof of the mouth is a triangular rough space, and near the gullet there are two others of a roundish form. The scales are of a middling size, thick set, and adhere closely to the skin. It has thorns or prickles about its head; and the eyes are large, with an iris of a silver colour. The back is dusky, tinged with blue, and the belly is white. In young fish, the space above the side-line is marked with small black spots, which gradually disappear as it advances. The Bass is esteemed a very delicate fish, and extremely wholesome. It is

an inhabitant of the sea, and has never been found in our fresh-water streams.

NATURAL HISTORY of the RUFF.

THIS fish resembles the pearch, but is slenderer and smaller, seldom exceeding six inches in length: the body is covered with rough compact scales, from whence it has its English name. The back and sides are of a dirty green, the latter inclining to yellow; but both spotted with black. About the covers of the gills it is of a shining gold colour; whence it is sometimes called the gilded pearch. It is gregarious, assembling in large shoals, and keeping in the deepest part of the water. The first rays of the dorsal fin, like those of the pearch, are strong, sharp, and spiny; the other soft. The Ruff is a river fish.

NATURAL HISTORY of the STICKLEBACK.

THESE are common in many of our rivers, and are found in vast quantities in the Fens of Lincolnshire, and some of the rivers that creep out of them. Once in seven or eight years, such amazing quantities are found in the Welland, near Spalding, that they are used to manure the land. We are credibly informed, that a man employed by a farmer, got near four shillings a day, for a considerable time, by selling them at an halfpenny per bushel. They are supposed to be the multitudes that have been washed out of the Fens by the floods of several years, and collected in some deep hole, till, overcharged with numbers, they are periodically obliged to attempt a change of place. This fish has only one fin on the back, with three distinct spines or prickles placed before it, which it can raise or depress at pleasure: the eyes are large, the belly prominent. The mouth is furnished with very small teeth; and the upper jaw is somewhat longer than the lower. The tail consists of twelve rays, and is even at the end. The colour of the back and sides is an olive green, and that of the belly is white.

There is a species of the Stickleback which has ten spines or prickles, and is a smaller fish than the above; and another that has fifteen spines, which grows to the length of six inches. The latter inhabits the sea, and is sometimes called the Sea Stickleback.

NATURAL HISTORY of the MACKREL.

THE Mackrel was greatly esteemed by the Romans, because it furnished the precious *garum*, a kind of pickle that gave a high relish to their sauces. It is a summer fish of passage that visits the British coasts in immense shoals. It is usually from a foot, to a foot and an half in length, and seldom exceeds two pounds in weight.

The Mackrel is a most beautiful fish when alive, as nothing can exceed its brilliancy of colour; but it is greatly impaired by death, though it continues to merit the appellation of a beautiful fish. The body is long, thick, and fleshy, but very small and slender towards the tail. It is not entirely destitute of scales, but what it has are extremely thin and small. The colour of the back and sides is a fine green, varied with blue, marked with black lines, pointing downwards; beneath the line, the sides and belly are of a silvery colour: the tail is broad and forked, and appears to be almost separated into two distinct fins. The nose is taper and sharp-pointed; the jaws are of an equal length, and furnished with teeth, which are small, and numerous: the

the eyes are large, the tongue sharp, and the nostrils small and round. It is a fish of prey. When just taken, the flesh of a Mackrel is delicate food, and it is esteemed even after it is brought up to London. Those who have tasted Mackrel perfectly fresh, know how much they are superior to those which have been taken two or three days.

They have a method in Cornwall of pickling and salting Mackrel, where it proves a great relief to the poor during winter. They are recommended for the jaundice, and obstructions of the liver. This fish is much used in England, but, as we have already observed, only for a certain season of the year, after which it disappears; but in some countries they have it at all seasons.

It is nourishing food, and reckoned to be of a dissolving nature; but is heating, and not reckoned wholesome, producing viscous and gross juices, and is not easy of digestion. It contains much oil, volatile salt, and phlegm. Bellonius blames those who boil a Mackrel, and says it should be roasted, and seasoned with such things as promote digestion. The roasting certainly divests it more of its viscous and gross juices. It agrees, in spring and summer, with young people of a healthy constitution, who have a good stomach.

Mackrel are found in large shoals in many parts of the ocean, but especially on the coasts of France and England. They enter the English channel in April, and take their course through the straits of Dover, insomuch that in June they advance as far as Cornwall, Suffex, Kent, Normandy, and Picardy.

They are taken either with the angle or with nets. When they are angled for, it must be out of a boat, or smack, or a ship that lies at anchor. The best bait for them is a bit of herring put upon a strong hook; but when this is wanting, a shrimp, or a bit of any other fish will do, or even a piece of scarlet cloth; for they bite so freely, there is almost a certainty of having sport: when you have taken one, a bit of their own flesh will serve for a bait. There is no occasion to be curious about your tackle, for you may even fish without a rod, and with several hooks at a time. In the West of England they fish for them with nets, near the shore, in the following manner: one man fixes a pole into the sand, near the sea, to which he fastens one end of a long net. Another in a boat takes the other end of the net in his boat, and rows round in a circuit as far as the length of the net will permit, and then back towards the shore; when his boat turns round he steps into the water, and taking the cord of the net with him, drags the net towards the shore; then upon a signal given, both the men draw the net out of the sea, and by this method often catch three or four hundred fish; they are immediately carried away by horses, which wait for that purpose. The quantity of Mackrel sometimes taken upon that coast is almost incredible; and then they are so cheap, that they are not worth carrying away.

The flesh of a Mackrel is very good when fresh, especially if they are dressed when just taken out of the water, and there is such a difference between them and those that are brought to London, that it is not to be conceived by any that have not tried. However, they are not to be despised, even when they are well cured by pickling, and put up into barrels.

There are two ways of pickling them; the first is, by opening and gutting them, and filling their bellies with salt, cramming it as hard in as possible with a stick; which done, they range them in strata, or rows, at the bottom of the vessel, strewing salt between the layers. In the second method, they put them immediately into tubs of brine, made of fresh water and salt, and let them steep so long, till they

think they have imbibed salt enough to make them keep; after this, they take them out and barrel them up, taking care to press them down as close as possible.

NATURAL HISTORY of the TUNNY.

THIS is also called the Spanish mackrel. The form of the Tunny, however, is less elegant than that of the mackrel, being rather thicker in the middle. The colour of the upper part of the body is dusky, varied with blue and green, and the sides and belly are silvery. They grow to a large size, sometimes being found of upwards of a hundred weight. They are fish of passage, and ramble from one part of the sea to another, at a considerable distance. In the months of September and October they quit the ocean, and pass through the strait of Gibraltar, into the Mediterranean sea, towards the Levant. They make a great article of provision in the adjacent kingdoms. Amazing quantities of them are taken in nets, for they come in vast shoals, keeping along the shores. They are not common in our seas, but are sometimes taken on the coast of Cornwall, with their stomachs full of pilchards. The flesh of the Tunny, though not very delicate, is said to be tolerable food when properly cooked.

NATURAL HISTORY of the SCAD.

THIS is called the horse-mackrel by the inhabitants of London: it resembles the common mackrel in colour, shape, and flavour; but it is smaller, and the body is thinner. The head, and the upper part of the body are varied with green and blue, and the belly is silvery. The scales are very large and thin: the lower half of the body is quadrangular, and marked on each side with a row of thick strong scales, prominent in the middle, and extending to the tail. It is taken on the coast of Cornwall, and many other places.

NATURAL HISTORY of the GREY GURNARD.

THE colour of the back and tail of this fish is of a deep grey, covered with small scales, and spotted with yellow or white. The head is very large, covered with bony plates which have prickles on them. The snout terminates in two horns; the mouth is large; and the jaws, the roof of the mouth, and the base of the tongue, are armed with very small rough teeth. The body gradually becomes smaller from the head to the tail, and it has a furrow in the middle of the back, armed on both sides with a row of bony thorns, from which the fins arise. The flesh of the Grey Gurnard is firm, and has a good flavour.

The red Gurnard, or rocket, resembles the former, but differs in size, seldom exceeding twelve inches in length: the head is less; the body and fins are more red, and the covers of the gills are engraved with streaks or rays, proceeding, as it were, from a center.

NATURAL HISTORY of the PIPER.

THE Piper is of the same colour as the red Gurnard, except that it has a yellowish head. The snout is divided into two broad horns, each terminated with three spines or prickles. The spines on the back are larger and longer than those in other fish of this kind. The nostrils are very minute;

minute; the eyes large; the lower jaw much shorter than the upper; and the teeth very minute in both. This fish is found on the Western coast, at all seasons of the year, and is esteemed a great delicacy. It is called the Piper, from the noise it makes. They are often seen to weigh three or four pounds, and to measure from twenty to twenty-four inches.

NATURAL HISTORY of the TUB FISH.

THE form of the Tub Fish is more slender than that of the piper. The pupil of the eye is green, and on the inner corner of each are two small spines. But it is principally distinguished from the other species, by the breadth and colours of the pectoral fins, which are very broad, and of a palish green, most beautifully edged, and spotted with rich deep blue. The back is of a greenish cast: the sides are tinged with red; and the belly is white. These fish are often taken on the coast of Cornwall.

NATURAL HISTORY of the LOACH.

THIS is also called the Groundling; it is found in several of our brooks or small rivers, where it usually keeps at the bottom on the gravel, whence it owes its second name. It is frequent on the stream near Amesbury, in Wiltshire, where the sportsmen swallow it down alive in a glass of white wine, and suppose it an excellent remedy in consumptive cases. In shape and colour it resembles a gudgeon, but is smaller and shorter. The body is soft and slippery, and his tail broad, but not forked; and there are few or no scales. The colour of the head, back, and sides is white in some, and in others of a dirty yellow, very elegantly marked with large spots, consisting of numberless minute black spots. On the upper jaw there are three pair of barbs, one at each corner of the mouth, and two near the end of the snout. The eyes are small, and have their iris yellow. The flesh is extremely tender and delicate.

NATURAL HISTORY of the SALMON.

THIS is a northern fish, being unknown in the Mediterranean sea, and other warm climates; it is found in France, in some of the rivers that empty themselves into the ocean; and North as far as Greenland. In several countries they are a great article of commerce, being cured different ways, by salting, pickling, and drying: there are stationary fisheries for them in Iceland, Norway, and the Baltic; but the greatest are at Colrairie in Ireland; and at Berwick, in Great Britain. The Salmon was known among the Romans; and Pliny speaks of it as a fish found in the rivers of Aquitaine.

It has different names, according to its different ages: those which are taken in the river Ribble, in Yorkshire, are in the first year called smelts, in the second, sprods, in the third, morts, in the fourth, fork-tails, in the fifth, half-fish, and in the sixth, when they are thought to have attained their proper growth, they are deemed worthy of the name of Salmon. In all parts of Europe the size of this fish is nearly the same, and the largest weigh from thirty to forty pounds.

The Salmon is a beautiful fish; the body is longish, covered with small thin scales; the head is small in proportion to the body, and has a sharp snout: the tail is forked. The back is of a bluish colour, and the other parts are generally white, intermixed with

blackish or reddish spots, placed in a very agreeable manner. The female may be distinguished from the male, by having a longer and more hooked snout, in having scales that are not so bright, and also in having its body speckled all over with dark brown spots. The belly is also flatter, and not so red.

The excrescence growing from the lower jaw of the male, which is a bony gristle like the beak of an hawk, is a defence provided by nature, against such fish as would devour their spawn: it grows to the length of about two inches, and falls off when the fish returns to the sea. The Salmon is likewise more spotted in fresh water than in the sea: the teeth are small in proportion to its body; and the gills are quadruple, with a broad cover full of red spots. The flesh, when fresh killed, is not so red as when it is boiled or salted: it is tender, luscious, and flaky, and soon satisfies; it is generally preferred to that of other fish.

The Salmon is indeed so universally known, that a minute description is unnecessary. They are cured in the following manner: they are split, and rubbed with fine salt, and after lying in pickle for six weeks, they are packed up with layers of coarse brown Spanish salt in casks, six of which make a ton. These are exported to Leghorn and Venice, at the price of twelve or thirteen pounds per ton; though they were formerly sold at a much greater price.

The Salmon lives both in the fresh and salt waters; quitting the sea at certain seasons in order to deposit its spawn in security, in the gravelly beds of rivers remote from their mouths. Salmon are often taken in the Rhine, as high up as Basil; they gain the sources of the Lapland rivers, in spite of their rapid courses, and surpass the perpendicular falls of Leixlip, Kennerth, and Point Aberglastyn.

This fish lives several years, and may be kept a long time out of the water before it dies. The best Salmon is well fed, large, of a middling age, tender, short, reddish, and taken in fine clear and running water. It is tender, short and savoury, and abounds with volatile salt, and oily and balsamic principles, which render it nourishing, strengthening and invigorating; it is diuretic, pectoral and restorative; but if eat immoderately, being very fat, it causes reachings and indigestions; and if too old, it is dry, hard, and heavy upon the stomach.

The Salmon-fishery was an article of so much importance, that so early as the 13th of Edward the First, an act was passed to prohibit the capture of the Salmon, from the nativity of our Lord to St. Martin's day, in the waters of the Humber, Owse, Trent, Done, Arre, Derwent, Wharfe, Nid, Yore, Swale, and Tees; and successive monarchs have provided for the security of the fish in other rivers.

The smelts, or fry of Salmon, leave the Mersey about May or June, and then weigh about two ounces a-piece: they return about August or September, and weigh from one pound and an half to two pounds. Their greatest magnitude is much the same in most parts of Europe, and when they are largest, they weigh from thirty-six to fifty-four pounds; one of this last weight being caught at Lachford Causey, in the year 1763.

Salmon ought to be kept a few days before it is dressed, for which reason it is better when it reaches London, than when caught in the Mersey. About the time of spawning, it grows more insipid, and loses its lively colour. Some begin to be out of season presently after the summer solstice, and others soon after, which may be known by their falling away, their losing their beautiful spots, and by their colour;

colour; infomuch, that when they are quite out of season, they look like a fish of a different species, and are then called knippers.

The Salmon chuses the river for his abode about six months in the year; they enter the fresh water about December or January, and are sometimes caught in the Mersey, in November, February, or March, where they continue till the autumnal season, at which time they cast their spawn, and soon after return to the sea. But directly the contrary of this is reported of those in the river Ex in Devonshire, and the river Wye and Usk in Monmouthshire, where the Salmon are said to be in season during the other six months.

When spawning time arrives, the female seeks a proper place, in a gravelly bottom, where she has been observed to work with her head, tail, belly, and sides, till she has formed a kind of *nidus*, of the same dimensions with herself; which done, she discharges her spawn, and retires; then the male or milter, advances: this is no sooner over, but the female returns to the male, when they use their joint endeavours to cover their brood with the gravel, in which they work with their noses like hogs: after this they return to the deeps to recover their strength, which they do in about twenty days. About this time this fish is of very little value; but to prevent their destruction, the laws of the land inflict a penalty on those who shall destroy Salmon between the 11th of August and 22d of November; but it would be better for the community, if it was the 11th of September and the 22d of December.

There is nothing relative to this fish, which has been more talked of, than its agility in leaping over the obstacles which oppose its passage either to or from the sea; for they are frequently seen to throw themselves up cataracts and precipices many yards high. They sometimes make several essays before they can gain their point, and when they have done it, it has been often to their own destruction, for they have leapt into baskets placed on purpose to catch them. There is a remarkable cataract on the river Tivy in Pembrokehire, where people often stand wondering at the strength and agility which they exercise to get out of the sea into the river; on which account it is known in those parts by the name of the Salmon-leap. On the river Wear, near the city of Durham, there is another of this kind, which is supposed to be the best in England: there is another at old Aberdeen in Scotland, where such great plenty of Salmon has been caught, that they have been deemed the principal trade of the place. Whenever their passage to the sea is intercepted by weirs, or any other contrivance, they soon grow sickly, lean, and languid; and if they are caught in that condition, when they come to the table, they prove tasteless and insipid: in the second year they pine away and die. It is worth observation, that the Salmon is not only desirous of returning back to the rivers, but to that very river where it was spawned, as evidently appears by an experiment made by fishermen and others, who have caught them when very small, and have run a small ribbon, tape, or thread, through the tail fin: by this mark they have been certain that they have retaken the same fish, at the same place, as they returned from the sea: by this means they have likewise discovered, that the Salmon is of very quick growth, and considerably more so than any other fish.

The chief rivers in England that yield this excellent fish are the Thames, Severn, Mersey, Trent, Medway, Dee, Ex, Usk, Wye, Lon, Tyne, Werkington, Weaver, &c. However, our London markets are supplied soonest from the north, where they are not only more plentiful, but are in season before those of the southern rivers. The Mersey greatly abounds with Salmon, which in the spring

strive to get up that arm of the sea, and with difficulty evade the nets, which the fishermen spread to catch them before they get to Warrington-bridge, at which the place the river becoming narrower, and the land-owners having an exclusive right, each proprietor, by his agents, catches Salmon, which, in the whole, amounts to above one thousand pounds a year; by which means the towns of Warrington, Manchester, and Stockport, are well supplied, and the overplus sent to London, by the stage-coaches, or carried on horseback to Birmingham, and other inland towns. Thus having given a general account of the nature of the Salmon, we shall now proceed to the method of taking him with the angle.

It is necessary to premise, that the Salmon does not remain long in a place, but seems desirous of getting still nearer to the head of the spring. He does not lie near the bank-side, nor under the roots of trees, but swims in the deep and broad parts of the water, generally in the middle and near the ground. But the Salmon-smelts generally lie in the rough and the upper part of a gentle stream, and usually pretty near the middle in the months of April and May, and nearer the side earlier in the spring.

The most alluring bait for the Salmon, in the western islands of Scotland, is a raw cockle taken out of the shell; with this they fish at the bottom, using a running bullet. This method is practised in the river Medway, in Kent, with success: let the cockle fall into a shallow, from which there is a gradual descent, into a deep hole. In most of the Salmon rivers of France, they use prawns or muscles taken out of the shell. In the month of October, they go up the smaller rivers as far as they can to spawn. At that season of the year many Salmon get high up the river Mersey, where some few are caught by angling: but the far greatest part of them are destroyed by poachers with spears, though the first are at that time of little or no value. Thus considerable damage is done to the breed of Salmon, and it were to be wished, that the justices of the peace would a little more exert themselves, and enforce the laws to punish these offenders.

The most usual baits are lob-worms, small dace, gudgeons, bleaks, minnows, or two well-scoured dew-worms, which should be often varied, in order to suit the humour of this fickle fish; as what he likes one day he will despise the next. Though it must be owned it is a very disagreeable circumstance to an angler, and which he often meets with to exercise his patience, to see the fish sporting on the surface of the water, and not be able to tempt him with any of his baits. However he generally bites best about three in the afternoon, in May, June, and July, especially if the water happens to be clear, and there is a little breeze of wind stirring; but there will be still a greater probability of success if the wind and stream set contrary ways. There is a fly called the horse-leech-fly, which he is very fond of; they are of various colours, have great heads, large bodies, very long tails; and two, some have three pair of wings; behind each pair of wings, whip the body about with gold or silver twist, or both, and do the same by the head; with this fly, fish at length, as for trout, and grayling; but if you dip, do it with two or three butterflies, of different colours, or with some of the most glaring small flies you can find. When you make use of the fly, let your hook be strong and large; but it would be better to have two well scoured lob-worms, as they have been found most successful in fishing at the bottom. In this case, let your hook be large, and armed with gimp; for though a salmon, when struck, seldom attempts to bite the line, yet, as you will be obliged to play the fish for some time, the line must rake

against

against his teeth, and you will be in great danger of losing your prize without this precaution. Next to gimp are recommended the bristles of a Westphalia hog doubled; which yet are only preferable to ours on account of the length. If, therefore, you cannot easily procure the former, you may make use of our own, which being often lapped into the length of half a yard, have been found proof against the teeth of a jack, when trowling for that fish. Whenever you observe a Salmon leap out of the water, you may safely conclude there is a deep hole not far off; and if the river is too broad for you to throw a fly, or if a contrary wind hinders you, then lay your ledger-bait as near the hole as you can, and you may probably meet with success, for he always chuses such places for retirement. If you bait with a dace, gudgeon, &c. then put on your swivel and reel, and make use of a large cork-float, with your live bait about mid-water.

For the Salmon-fry, or scegger, called also a Salmon-smelt, the properest baits are ant-flies, brandlings, earth-bobs, gentles, black and dun gnats, all coloured small hackles, and dub'd flies according to the season; when they rise at fly, and a little before they leave the river, they usually get together in large shoals, where you will see ten or a dozen rise at a time; if you light of a shoal, you will never fail to have sport, as they rise very freely. You may use three or four hooks to one line, tied to single hairs. They are also frequently caught with the red worm in fishing for gudgeons. The places where they are generally found are the scours near the deeps, or amongst wood or weeds. They always leave the Mersey in May or June. Two of them were, whilst small, put into a fish-pond, at Stockport, and took out again in three years, when they weighed five pounds.

The chief Salmon fisheries in Europe, are along the coasts of England, Scotland and Ireland; the fishing usually begins about the first of January, and ends the eleventh of August. It is performed with nets in the places where the rivers empty themselves into the sea, and along the sea-coast thereabout; because these fish are seen to crowd thither from all parts in search of fresh water. They also fish for them higher up in the rivers, sometimes with nets, and sometimes with locks or weirs made for that purpose with iron gates: these gates are so contrived, that the fish in passing up the river can open them with their heads, but they are no sooner entered than the gates clap to, and prevent their return. Thus the Salmon are inclosed as in a reservoir, where it is easy to take them.

Near Flixon in Lancashire, they fish for Salmon in the night-time, by the light of torches, or kindled straw, which the fish mistaking for the day-light, make towards, and are struck with the spear, or taken with the net, which they lift up with a sudden jerk from the bottom, having laid it in the evening before opposite the place where the fire is kindled. In some parts of Scotland, it is said, they ride a fishing up the rivers, and when they espy them in the shallows, they shoot them with firearms. It is very common to dart Salmon as they are endeavouring to get over the weirs.

When the fish are caught, they open them, take out the guts and gills, and salt them in large tubs made for that purpose, out of which they are taken before October; and are packed up in casks, from 300 to 450 pounds weight.

The season for fishing in the Tweed, begins November the 30th, but the fishermen work very little till after Christmas; it ends on Michaelmas day: but the corporation of Berwick, who are conservators of the river, indulge the fishermen with a fortnight after that time, on account of the alteration of the style.

There are forty-one considerable fisheries on the Tweed, extending upwards of about fourteen miles from the mouth, which are rented for near five thousand four hundred pounds per annum. A misfortune attends this river, which requires a parliamentary remedy: there is no act of parliament for preserving the fish in it during the fence months, as there is in the case of many other British rivers. The Tweed being the boundary between England and Scotland, part of it belongs to the city of Berwick, and the whole north side (beginning about two miles from the town) is entirely Scotch property. From some disagreement between the parties, they refuse to unite for the preservation of the fish; and in some fisheries on the north side they continue killing Salmon the whole winter, when the death of one fish is the destruction of thousands.

About the month of July, the capture in the Tweed is prodigious: in a good fishery a boat load of them are often taken at a time: upwards of seven hundred fish have been known to have been taken at one haul: but from fifty to one hundred is no uncommon occurrence.

NATURAL HISTORY of the SALMON TROUT.

THIS fish is also called the Bull Trout, from the thickness and shortness of its head. It differs from the salmon in having the tail less forked; from the grey, in having a shorter and thicker head; and from both in being smaller, seldom exceeding twenty inches in length. Its flesh is white, and less delicate than that of the salmon and grey.

They delight to lie in deep holes, and usually shelter themselves under the root of a tree. When they watch for their prey, they generally chuse that side of the hole which is towards the stream, that they may the more readily catch whatever food the stream brings down. They will rise at an artificial fly like a salmon: but the best bait for them is a well scoured brandling, especially those that breed in a tanner's yard.

You may angle for them any time in a morning, and in the afternoon from five till night. They are in season all the summer. When you try to catch them, remember to keep out of sight, and let your line fall into the stream, without any lead, except one single shot, and then it will be carried gradually into the hole. When you have a bite you ought not to strike too eagerly; they bite freely enough, and struggle hard for their lives. It is necessary to observe, that some give the name of Salmon Trout to a young salmon, which has occasioned several to run into errors in treating of this fish. They have likewise in France a kind of Pond Trout, which they call a Salmon Trout, that grows to such a magnitude as to weigh above thirty pounds; and in the Lemane Lake near Geneva, there are some of this kind, that weigh fifty pounds.

NATURAL HISTORY of the GREY:

IT differs but little from the Salmon in size, though it is very different in shape; being broader and thicker; and the tail not-being forked. The body is all over speckled with ash-coloured or grey spots; from whence it derives its name. The flesh is preferable to that of salmon, and bears a much higher price. This fish has great strength and agility, making its way from the sea into the rivers with extreme swiftness; surmounting almost every obstacle with the greatest ease. This fish is therefore seldom taken, and consequently but little known. It does not ascend the fresh waters till August, which is the time of spawning.

NATURAL

NATURAL HISTORY of the TROUT.

THE Trout is a fish of excellent taste, and is covered with small scales, usually streaked with red. There are several species of this fish, which live in various places, and differ in colour and size. Some are found in deep and rapid rivers, others in lakes; some are of a blackish colour, others reddish, and rather of a gold colour, and variously marked with spots of a purple or vermillion die; but on the belly they have a yellowish cast.

This fish swims with much agility and swiftness, and is said on hearing thunder to be so astonished, as to become immovable. It feeds upon worms, slime, mud, insects, and small fishes, which it pursues with so much eagerness, from the bottom to the surface of the water, that it sometimes throws itself into the boats passing near it.

Trouts, besides being well tasted, produce good juice, because they are always in motion, feed upon good food, and usually swim in clear and running streams: thus they acquire less gross and vicious humours, eat short, and are easily digested; but they soon putrefy and corrupt, and therefore should be eaten soon after they are brought out of the water.

The Trout contains much oil, volatile salt, and phlegm; and agrees with any age and constitution. In summer it is most delicious, but in winter it is deprived of almost all the excellency of its taste. It may be boiled, fried, roasted, or baked; and some salt it for exportation.

There is a variety which is called in Latin *Thymallus*, a *Thymi Odore*, because it smells like thyme. It is delicious food, easy of digestion, has good juice, and so wholesome, that in some places they allow sick persons to eat it. Its shape resembles that of the common Trout, and it also lives in clear and running waters: it feeds upon the same food, and in some countries is more valued for the goodness of its taste than the other sorts. Its fat is good to remove prints of the small-pox, deafness, noises of the ears, specks, and catarrhs of the eyes.

The Trout is of a longish form, and resembles the salmon more than any other fish. The head is short and roundish, the nose blunt, the body thick, and the tail broad. The mouth is wide, and it has teeth, not only in the jaws, but on the palate and tongue. The eyes are large, with a reddish circle round the pupil; the rest of the iris being of a silver colour. The skin readily falls into wrinkles, and separates from the flesh. In the larger trouts, the back is of a dusky hue, and full of black spots, which in some are mixed with red. This fish has two fins on the back; that next the head is full of black spots, and the edge of that near the tail is of a vermillion colour. On the belly there are two pair, which are always either red or yellow.

It is surprizing that this common fish has escaped the notice of all the ancients, except Ausonius, who only celebrates it for its beauty; and that so delicate a species should be neglected at a time when the folly of the table was at its height; and that the epicures should overlook a fish that is found in great quantities in the lakes of their own neighbourhood, when they ransacked the universe for dainties. The milts of *Muræne* were brought from one place; the livers of *Scari* from another, and oysters even from so remote a spot as our *Sandwich*; but there was, and is now, a fashion in the article of good living.

The Trout is a voracious fish, and affords excellent diversion to the angler. These fish shift their quarters to spawn, and, like the salmon, make up towards the heads of rivers to deposit their spawn. They delight in cool and small streams, which de-

scend from rocky hills, and seem particularly fond of swimming against the course of the water. They are found in small rivers among the Alps, the waters of which are so cold, that no other fish can accompany them.

Trouts are not in the highest season when they are fullest of spawn, for they are fattest, and have the most delicious taste in July and August. They begin, however, to be in season in March, and become so in some rivers much sooner than in others. In winter they are lean, sick, and unwholesome, breeding a kind of worm with a large head, which in some degree resembles a clove. At that time the beautiful spots disappear, and the lively colour of the belly becomes dusky and disagreeable. But, towards the latter end of March, he rouses from his lethargy, rubs off his ill-bred foes against the gravelly bottoms, and soon after recovers his former strength and vigour. The flesh is drier and less tender than that of the salmon; it is, however, esteemed the most agreeable of all those fish that reside continually in fresh water.

The Fordich Trout seems to be of a different sort from the rest, because it is almost as large as a salmon, and lives nine months in the sea; besides it is seldom caught with the angle, being supposed not to feed at all in fresh water; and there seems to be a probable ground for this opinion, for when they are opened there is nothing found in their maw. Yet their return to the river is so very constant and punctual, that the fishermen know almost to a day when to expect them. When this fish is in full season, the flesh of it cuts white.

The usual baits for a Trout are a worm, minnow, and fly, either natural or artificial. The proper worms are the brandling, two upon a hook, lob-worm, earth-worm, dung-worm, and muggot, but especially the two first, and indeed, in fishing at the bottom, the lob-worm is preferable, and is most generally used.

This fish, as already observed, delights in the swiftest streams, at a stream-tail in spring and latter end of summer: in May he keeps the upper end, and on the shallows in summer, or at the tails of mills: he is particularly fond of a hole covered with boughs, and where the roots shoot down to the water's edge, where he can find a good hold: in such a place you may find the largest, and consequently you must angle for them near such places. When they watch for their prey, they generally shelter themselves under a bank, a large stone, or in the weeds, where they are often seen lurking entirely covered over except their heads. When they are discovered in this situation, go a little up the stream, and with great care and caution muddy the water, putting in your bait immediately in the muddy part; then keeping yourself as far from the bank as you can, in order to be out of sight, follow your float, and expect success.

Trout may be taken in this manner, either with a minnow, or two well scoured lob-worms. When you use two worms, put the first on the hook with the head foremost, and then slipping it a little up the line to make room, put on the other with the tail foremost, after which draw the first down to it quite close. This is likewise a good bait when you angle in the dawn of day, or in the dusk of the evening, or even in the night when it is dark. In this case you must put no lead on your line, but throw your bait as gently as you can across the stream, and draw it softly to you on the top of the water. This is the best method of catching the oldest and largest Trout, for they are very fearful and shy in the day-time, but in the night they are bold and undaunted, and generally lying near the top of the water in expectation of meeting with food; for if they see any thing in motion, let it be what it will, they will cer-

tainly

tainly follow it, if it glides gently along. If you put the point of your hook in at the head of your first worm, and out at the knot, and slip it a little way up the line, that you may bait the other the same, so that both tails may play, you will find it answer very well.

In angling for a large Trout in muddy water, it requires some art in baiting your hook; suppose, for instance, the bait is a dew-worm, you must then thrust the hook in towards the tail, a little above the middle, and out again below the head, then draw him above the arming of the hook, or whipping, and put the point into the head of the worm, till it is very near the place where the point of the hook first came out, and so draw back the worm, or that part that was above the shank. This hook should be pretty large. A water clearing, after a flood, or dark, cloudy, and gloomy weather, when it is windy, is most favourable for worm fishing. In March, April, September, and part of October, the warmest sun-shiny weather, and the middle of the day, is best.

Some make a practice of fishing at the bottom in the dark, with a little bell fixed to the top of the rod, in such a manner, that when the Trout takes the bait, the sound of the bell may give notice of the bite; but others think this method is very precarious, because the least weed that touches your line as it comes down the stream will deceive you. The surest way is to hold your rod in your hand, for as the Trout is a bold biter, you will easily perceive when he takes the bait: as soon as you have struck it, give it the but of your rod, or if you hold it the least upon a level, you are in danger of losing your line. There is a very excellent method: make a pair of wings of the feather of a land-rail, and point your rod with one or more cadis; your hook should be bristled, and the head of your cadis kept close to your wings, and angle with a rod about five yards, and a line about three; cast your wings and cadis up the stream, which will drive it down under the water towards the lower part of the hole; then draw it gently up the stream, a little irregular, shaking your rod, and in a few casts you will be sure to hook him, if there is one in the hole. You may angle the same way with two brandlings. If you use two cadis with your wings, run your hook in at the head, and out at the neck of the first, and quite through the other from the head to the tail: this is a much approved method for catching large Trout.

In angling with a fly, let your rod be rush-tapered, with a very slender top, that you may throw your fly with greater certainty and ease; for if the top is too stiff, the fly will be soon whipped off. Your line should be three times the length of your rod. In this kind of angling, you should place yourself so that the wind may be upon your back, or at least you must chuse such a time and place, that the wind may blow down the stream, and then it will assist you in laying your fly upon the water, before your line touches it; for if your line touch the water first, it will cause a rippling that will fright the fish away.

The cad-bait upon the point of the hook with the artificial fly is recommended. Or another way to angle with the cad-bait, is on the water, as with a fly. It must stand on the shank of the hook, as the artificial fly, (not come into the bend, or the fish will not value it, nor if you pull the blue gut out) and thus it is a most excellent bait for the Trout. Where the river is not violently swift, you may place a very slender lead on the shank, and draw the cad-bait over it: raise it often from the bottom, and so let it sink again; by which means you will find good sport, either in muddy or clear water. You may imitate the cad-bait, making the head of black filk, and the body of yellow wax, or

of shamoy. When the fish appear at the top, they will take the oak-worm upon the water, rather than under it, or than the fly itself; and it is more desired by them. After you have dibbed with these flies on the surface till they are dead, cut off their wings, and fish with them at mid-water, or a little lower. You may dib for a Trout also with a fly or grasshopper, as you do for a chub, under a bush, by the bank side, with a strong rod, and a short strong line. If they do not rise after half a dozen trials, there are none in the stream, or they dislike your bait.

You need not be very particular in the choice of your flies, for a Trout is not difficult, nor yet very curious about the season, for some have angled successfully with an artificial May-fly in August. The time of the Trout's biting is from sun-rising till near eleven in the morning, and from two in the afternoon till sun-set; and yet the most certain times, are nine in the morning, and three in the afternoon, especially if the wind be at south, for when it blows from that point it is most favourable to the angler. At this time, if you angle with a loach about a quarter of a yard deep in the stream, you are sure of catching fish. If you have not this bait, a bull-head, with the gill fins cut off, may prove a good bait, or a minnow, for want of the others. And as the Trout may be deceived by almost any fly at the top, so he seldom refuses any worm at the bottom, or small fish in the middle; for which reason he is sometimes caught when trolling for jack.

You may likewise dib for Trout in the same manner as you do for chub, only let your fly drop as gently into the water as possible, and keep it easily gliding along the surface; let it sink a little, and suddenly raise it again, with a strong rod, and a short strong line; but be careful to keep out of sight, for the shadow of your rod, or the flight of a bird over the river, will make them fly almost as swift as the bird, and it will be some minutes before they will shew themselves again. You will find good sport if you dib with the green snake-fly whilst alive, which is thus practicable: collect a quantity of them into a long draw-box, with holes in the cover to give them air, where also they will continue fresh and vigorous a night or more; take them out from thence by the wings, and bait them thus upon the hook: first take one, for it is common to fish with two of them at a time; and putting the point of the hook into the thickest part of the body under one of the wings, run it directly through, and out at the other side, leaving him spitted across upon the hook, and then taking the other, put it on after the same manner, but with its head the contrary way; in which posture they will live upon the hook, and play with their wings for a quarter of an hour, or more: but you must be careful to keep their wings dry; and also that your fingers be not wet when you take them out to bait them; for then your bait will be spoiled.

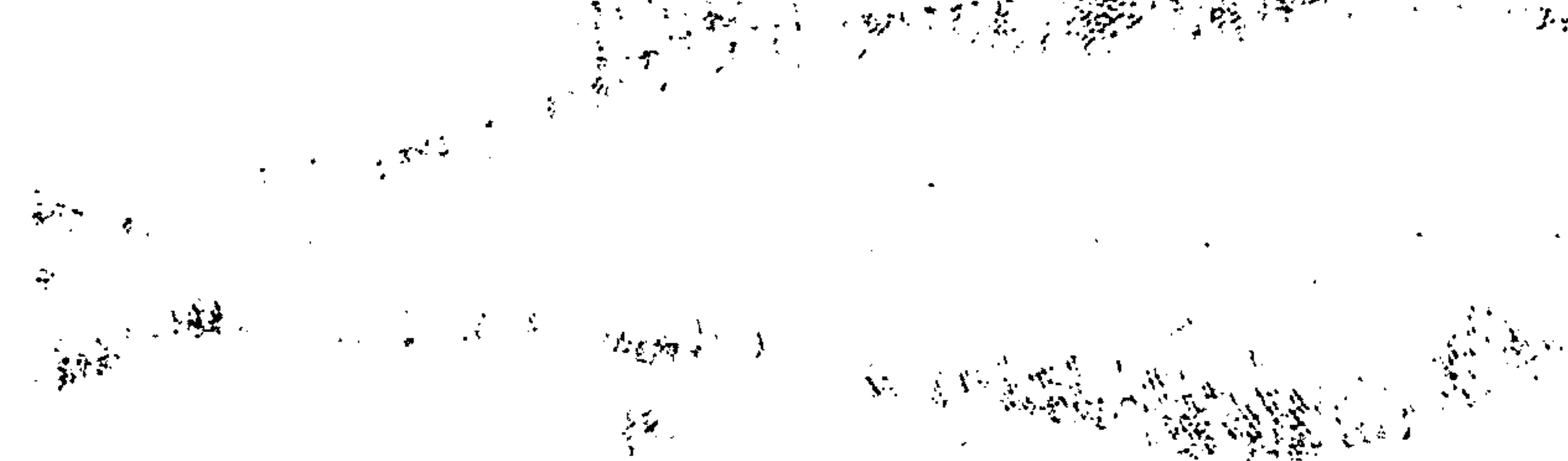
With the stone-fly you may likewise dib, but with this variation: the green drake is common both to stream and still, and to all hours of the day; this is seldom dibbed with but in the streams, (for in a whistling wind a made fly in the deep is better,) but observe, that morning is the time: but much better towards eight, nine, ten, or eleven o'clock at night, at which time also the best fish rise, and the later the better, provided you can see your fly, and when you cannot, a made fly will answer the purpose.

Trouts are taken in some parts of England by tickling them; there was a person who was very expert in that art; he would grope for them in their lurking places, and gently tickle their sides, which they seemed to be delighted with, till, at length, approaching their gills, he held them fast, and made

THE BROAD LEAF



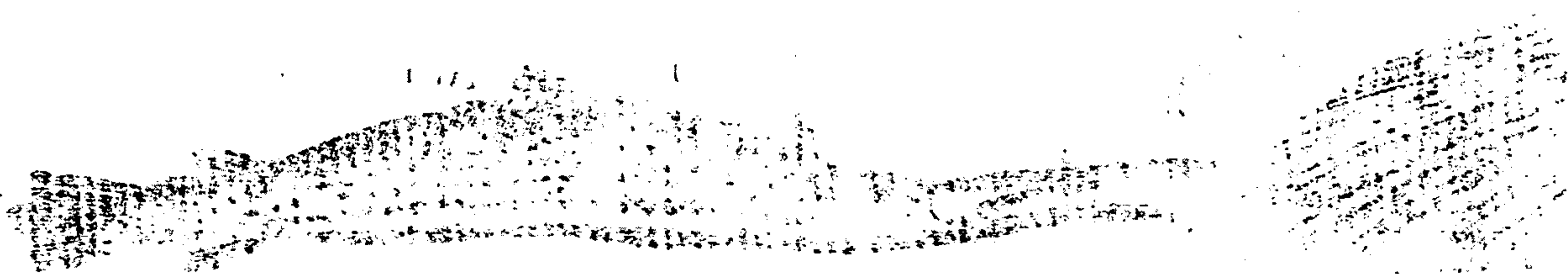
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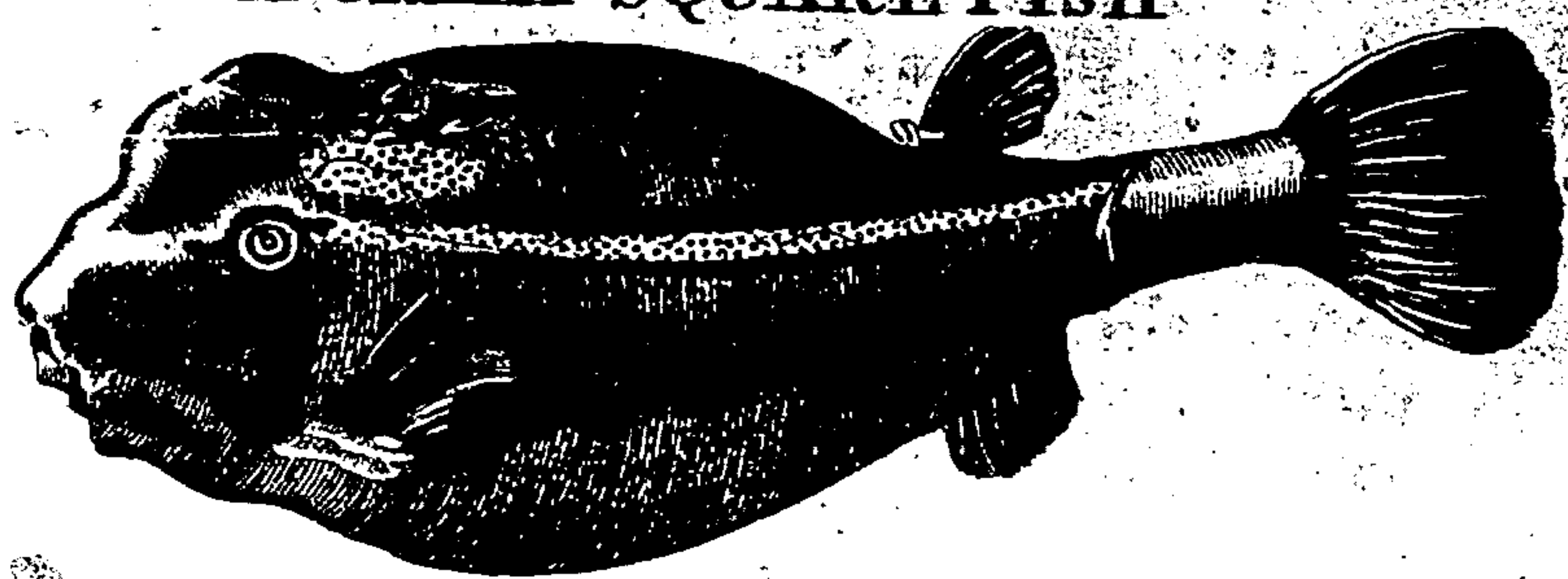
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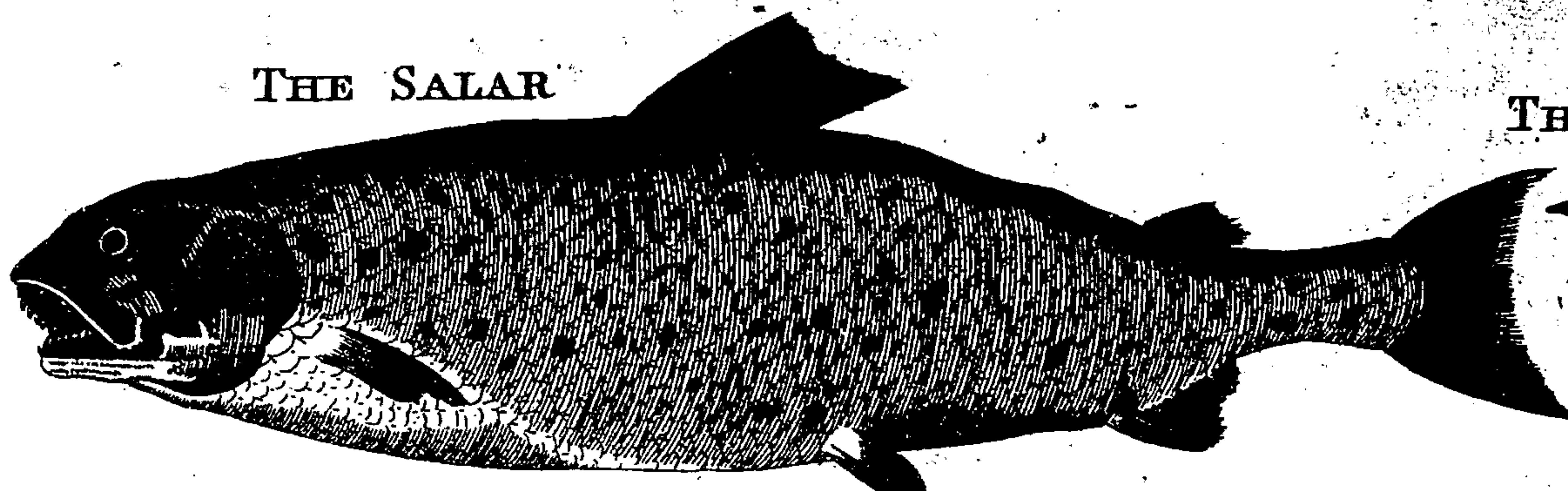
THE GREAT SQUARE FISH



THE BROAD GUAPERVA



THE SALAR



THE OXYRINCHUS



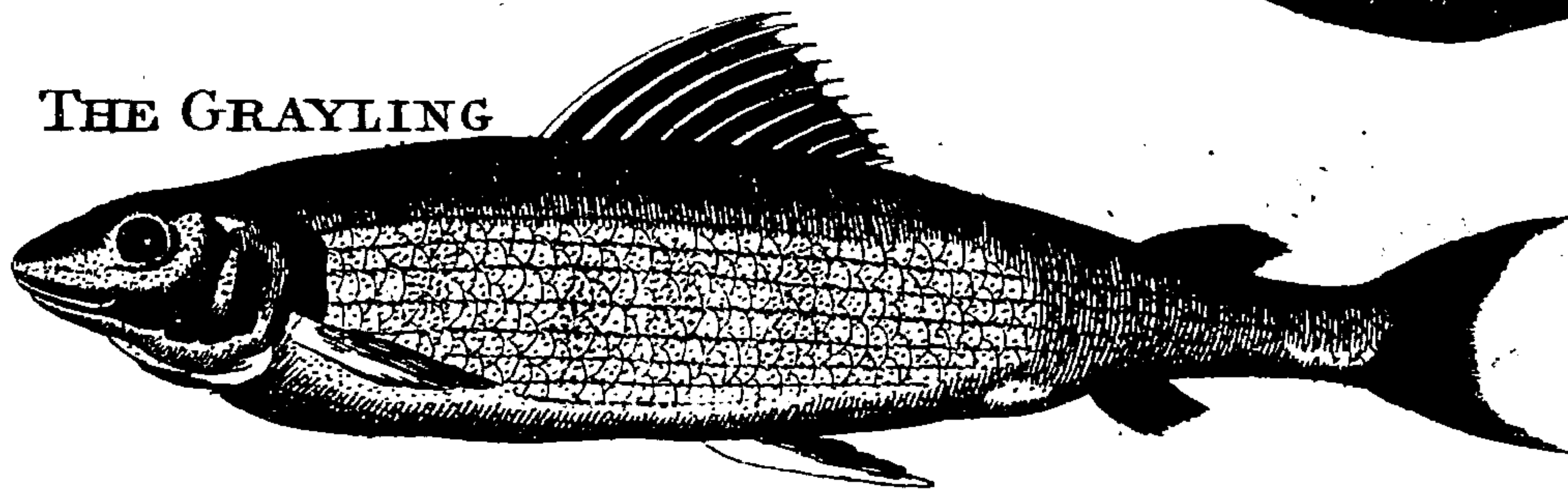
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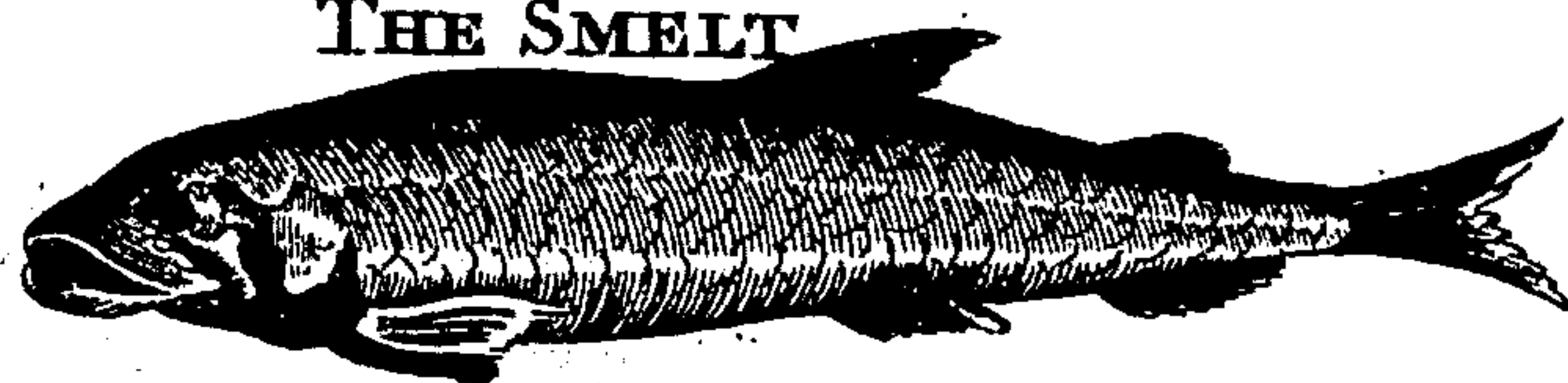
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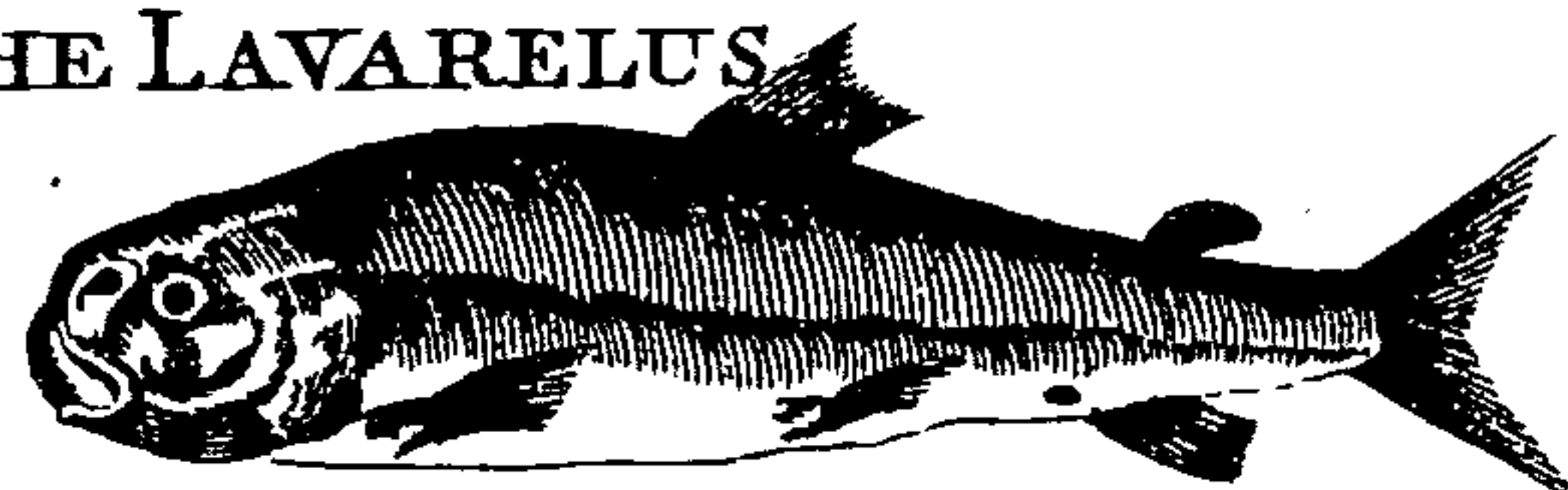
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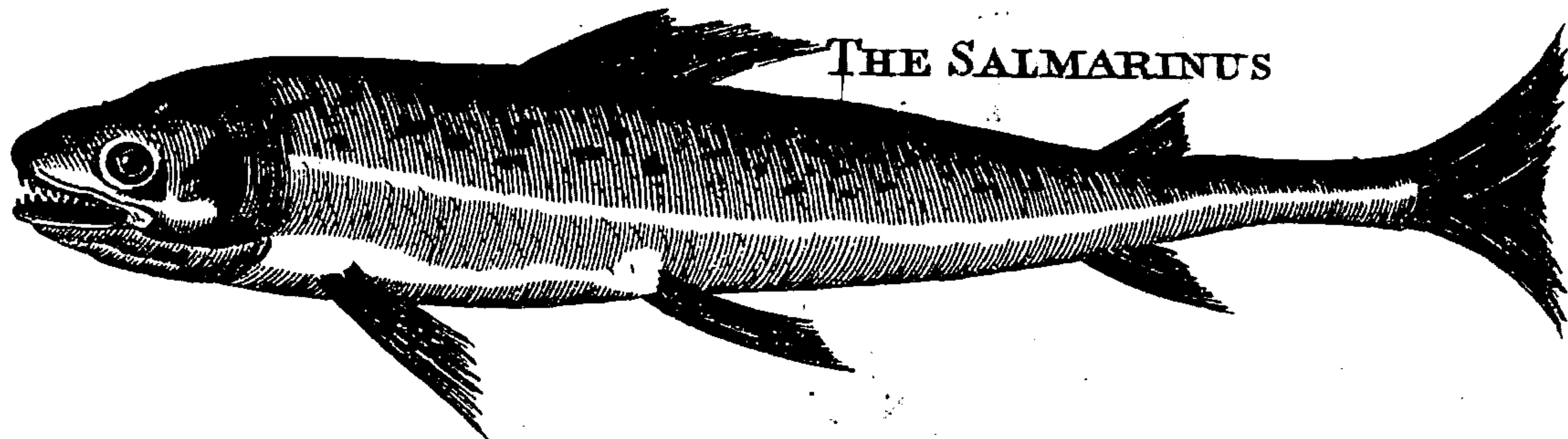
THE SMELT



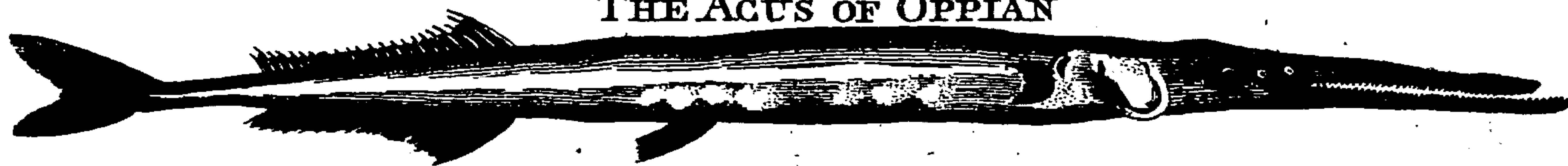
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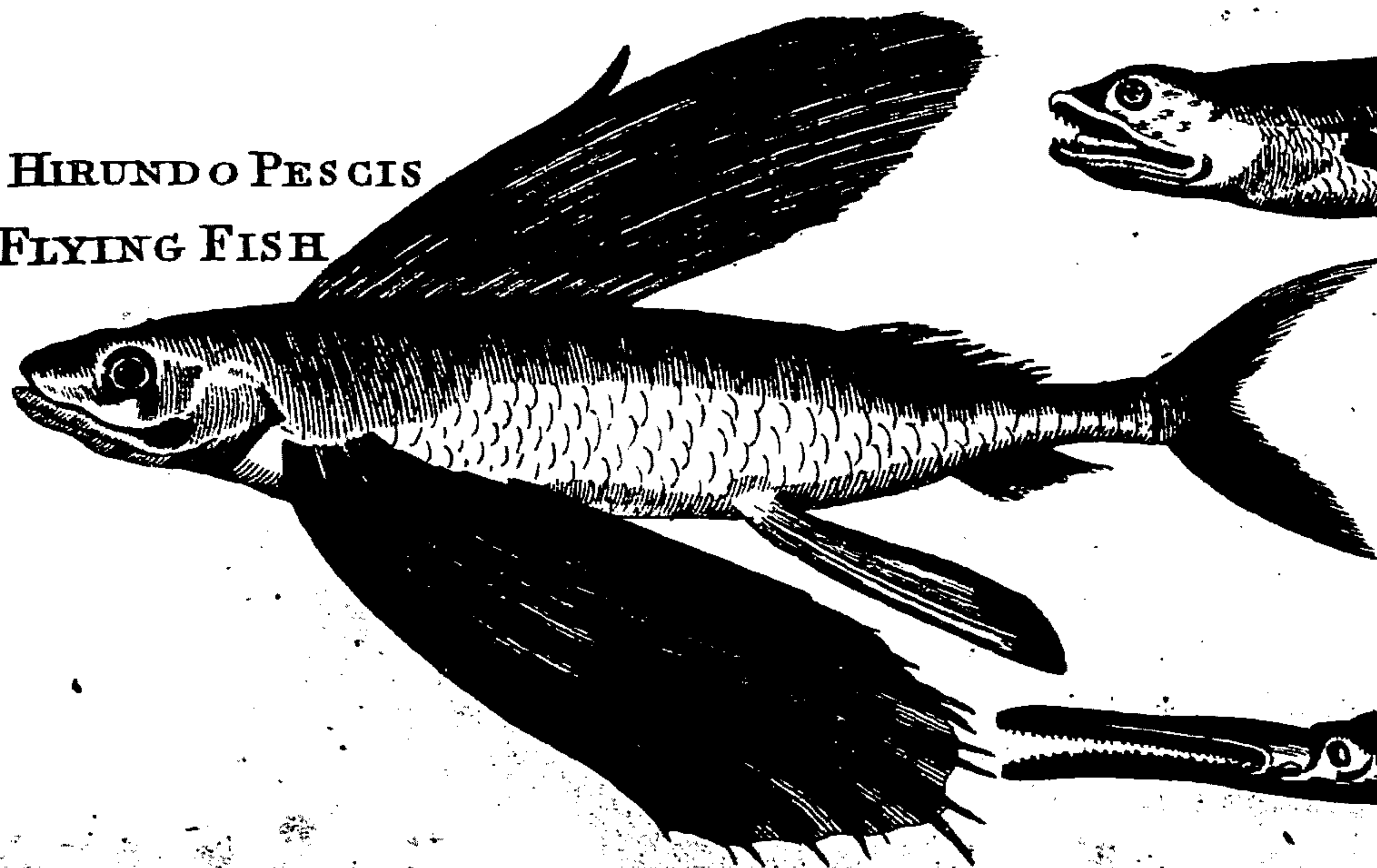
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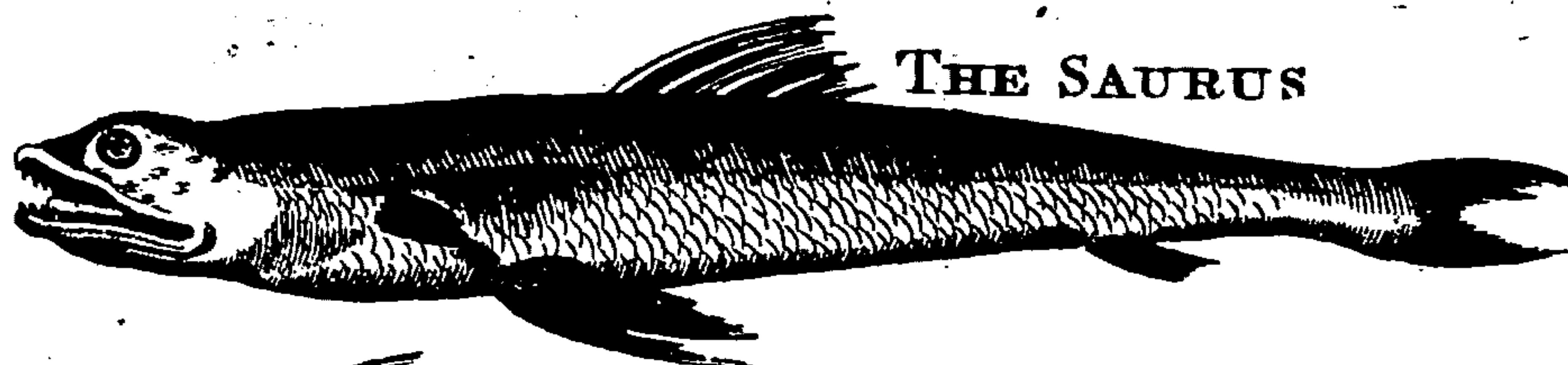
THE ACUS OF OPPIAN



THE HIRUNDO PESGIS
or FLYING FISH



THE SAURUS



THE LITTLE IPHYRCENA



THE SEALY ACUS



made them prisoners; and it is observed in the Philosophical Transactions, that carp are sometimes taken by the same way. Great quantities are also taken with the spear and lamp.

NATURAL HISTORY of the SAMLET.

THIS is the least of the trout kind, and is frequently found in the Wye, in the upper part of the Severn, and the rivers that run into it, in the north of England, and in Wales. It has a great resemblance to the trout, but is much smaller, seldom exceeding six or seven inches in length, and an inch and an half in breadth. It has fewer spots than the trout, and those which it has are not so bright. The Samlet is whiter, and has a more forked tail; the sides are not so yellow under the spots; and the lateral lines in a trout are larger and more red than in the Samlet. The Samlet has transverse spaces near the lines of a bluish colour, which the trout has not. Some imagine the Samlet to be the fry of the salmon, but they are certainly mistaken.

NATURAL HISTORY of the CHARR, or RED CHARR.

THE Charr is an inhabitant of the lakes of the north, and of those of the mountainous parts of Europe. It is found in great abundance in the cold lakes on the summits of the Lapland Alps, and is almost the only fish that is met with in any plenty in those regions. Very few lakes in our island produce this fish, and even those in no great plenty. It is found in Winander-mere, in Westmorland; and in Llyn Quellyn, near the foot of Snowdon, and in certain lakes in Merionethshire. It is also found in Scotland, in Loch Inah, and other neighbouring lakes.

The body of the Charr is longer and more slender than that of the trout, and the back is of an olive colour, speckled with whitish spots. In general the belly is red, though it is sometimes white, especially in the spawners: the scales are very small, and the lateral lines straight: the mouth is wide, and the jaws are nearly equal: the lower part of the fins are of a vermillion die, and the gills are quadruple. The Charr has teeth both in the jaws and on the tongue; and in the upper jaw it has a double row. The flesh is softer and more tender than that of a trout. The Charr is in very high esteem, and exceeding scarce. The inhabitants in the neighbourhood of Winander-mere make a practice of potting Charrs, which are usually sent as presents to remote friends; but they cannot be taken in sufficient quantities for sale even at an unreasonable price.

The GELT-CHARR.

The Gelt or Barren Charr, is one that has not spawned the preceding season, and on that account is reckoned to be in the greatest perfection. It is more slender than the red charr, as being without spawn. The back is of a glossy hue; the sides silvery, mixed with blue, and spotted with pale red: the sides of the belly are of a pale red, and the bottom white. This is found only in those lakes, which are also inhabited by the red charr.

NATURAL HISTORY of the GRAYLING, or UMBRÆ.

THIS is a voracious fish, and takes a bait very eagerly. It swims rapidly, and disappears like the transient passage of a shadow, from whence it probably derived the name of umbra.

"The *umbra* swift escapes the quickest eye."

It is a fish of an elegant form: the body is longer and flatter than that of a trout, and seldom exceeds eighteen inches in length. The head is dusky: the covers of the gills of a glossy green: the back and sides are of a fine silvery grey, from whence it has its name of Grayling; though they seem to glitter with spangles of gold, and are marked with black spots irregularly placed. The top of the back fin is red, and the lower part of a bluish purple: the fins of the belly are bluish, spotted with black. The lips are rough like a file, the tongue smooth, and the gills quadruple.

The Grayling haunts clear and rapid streams; particularly those that flow through mountainous countries. It is found in the Hodder, the Dove, the Trent, the Derwent, the Wye, and the Lug. It is also very common in Lapland. It is a firm, good, and wholesome fish. It may be eaten all the year, but in December it is in the highest season.

NATURAL HISTORY of the SMELT.

SMELTS are usually about six inches long, and near an inch in breadth, but they are sometimes found of the length of twelve inches; they have a very peculiar scent, from whence their English name is derived—*smelt*, that is, *smell it*. People greatly disagree respecting the scent of this fish; some assert it flavours of the violet, others of the cucumber: we acknowledge that we are of the latter opinion. The Germans however distinguish it by the delicate title of *flinck-fisch*. The Smelt is the least of these kind of fish, and is of a very beautiful form and colour: the head is so transparent, that all the lobes of the brain may be plainly and distinctly seen; and the skin in general is so thin, that, with a good microscope, the blood may be observed to circulate. The scales are small, and fall off with the slightest touch. The back is of a dusky colour, but the belly and sides shine like silver: the tail consists of nineteen rays, and is forked. The iris of the eye is silvery; the pupil of a full black; and the under jaw is the longest. It has four large teeth in the front of the upper jaw, and several small ones in the sides of both. It has two rows of teeth in the roof of the mouth; and two others of large teeth on the tongue.

Smelts inhabit the seas that wash the islands of Great Britain and Ireland the whole year, and never go very remote from shore, except when they ascend the rivers. It has been observed, that they are seen in rivers some months before they spawn, but immediately afterwards they all return to the salt water, and never appear again in the fresh streams till the next season. The flesh of the Smelt is soft and tender, and of a delicate taste; and is therefore in very high esteem. They are frequently served up to table as a kind of garnish to large fish; and they ought, in that case, to be considered only as garnish, for they are seldom fit to be eaten; the cook generally keeping them so long before the fire that they become dry, insipid, and tasteless.

Less than twenty years ago, Smelts were so scarce and valuable as sometimes to sell for four or five pounds the hundred; but they are now to be purchased, in general, for eight, ten, or twelve shillings per hundred.

In March, if the spring be mild, prodigious quantities of this delicate fish make their appearance in the river Mersey, which often seems of a greenish colour, from the vast bodies of Smelts which then swim about. At this time, every boat, every fisherman, and every net, is employed, and even the boys with cabbage-nets, catch these fish, which are double the size of those usually caught in the Thames;

sometimes the baskets, pails, boats, and the very banks, are filled with sparlings, as they are called in Cheshire, where, from the great plenty, they are frequently sold at four-pence *per score*. Some of these fish have been caught in Rostern Mere, and other still waters, where the fishermen have washed the spawn from their nets; but these fish appear lean; neither do they breed in ponds.

The best way of angling for them is with a pater-noster line, with a small shot to sink it under water: your baits should be earth-bobs, gentles well scoured, paste, or the fish itself, cut into small bits sufficient to cover your hook; they are seldom caught with angling, as they stay about Warrington but a little time after they have spawned, but they are caught in the salt part of the river all the year round with nets.

The SOUTHAMPTON SMELT.

This agrees with the common kind, in having two back fins, in colour, in the transparency of the back and head, &c. but has nothing of the violet or cucumber smell. It swarms in the sea about Southampton, and is the common bait for whiting, mackerel, flat-fish, &c.

NATURAL HISTORY of the GUINIAD.

THE Guiniad is an inhabitant of several of the lakes of the Alpine parts of Europe. It is also found in Scotland, Ireland, and Wales, particularly in Pemble-meer, a lake in Merionethshire. The shape of this fish is not much unlike that of the salmon, the usual length is about twelve or thirteen inches, and its greatest depth about three inches. The back is dusky, and the belly white. The head is small, smooth, and of a light blue on the top, speckled with darker spots, and the ends of all the fins are of a dark blue: the eyes are very large, and the pupil of a deep blue: the mouth is small and toothless; and the covers of the gills are silvery, powdered with black. The British word guiniad, which signifies whiting, was given it on account of the whiteness of its body. They are in season in the summer, and, though the fish is white, it has the flavour of that of the trout: it is however much higher in esteem, because it is a greater rarity. The Scotch have a tradition, that it was first introduced there by the beautiful queen, their unhappy Mary Stuart. These fish approach the shores in immense quantities in spring and in summer, and, in many places, prove a great relief to the poor.

NATURAL HISTORY of the PIKE.

THE Pike has a roundish oblong body, with a flat head, and square back: the snout is very prominent, and the lower jaw is somewhat longer than the upper. The mouth is very wide, and the teeth are very sharp, disposed only in the front of the upper jaw; but in both sides of the lower jaw, in the roof of the mouth, and sometimes on the tongue: the eyes are small, and the tail is forked. The body is covered with small thick scales, which are moistened on the edges with a kind of slime that has a greenish cast; and the younger the fish is, the greener he appears. The back and sides when turned towards the light, appear to have somewhat of a golden hue; the sides are spotted with yellow, and the belly is white. It has dusky spots, and reddish lines on the tail, especially towards the corners.

The Pike will swallow other fish which are almost as large as itself; not even excepting those of their

own kind. Innumerable are the instances mentioned by authors of the voracity of this fish. Mr. Pennant informs us of a Pike being choaked, by attempting to swallow one of its own species, that proved too large a morsel. It will devour the water-rat, and draw down the young ducks as they are swimming on the water. At lord Gower's canal at Trentham, a Pike seized the head of a swan, as it was feeding under water, and gorged so much of it as killed them both. Gesner indeed relates an instance that borders a little on the marvellous. He tells us, that a famished Pike on the Rhine seized on the lips of a mule that was brought to water, and that the beast drew the fish out before it could disengage itself.

The longevity of the Pike is very remarkable. Rzaczynski tells of one that was ninety years of age; and Gesner says, that in 1497 a Pike was taken near Hailbrun, in Suabia, with a brazen ring affixed to it, on which were the following words in Greek characters: "I am the fish which was first of all put into this lake by the hands of the governor of the universe, FREDERICK the Second, the 5th of October 1230;" supposing this to be a fact, the fish was at least two hundred and sixty-seven years of age.

Their usual time of spawning is in March, and sometimes sooner if the spring is forward. They are exceedingly prolific, forty-eight thousand eggs having been found in one of their roes. They are in season all the year, except in spawning time, and about six weeks after it. The flesh is firm, white and sweet; but if the fish exceeds ten or twelve pounds in weight, it has a rankish flavour.

The Pike is good and nourishing food, and agrees at all times, but especially in winter, with any age and constitution. Some authors pretend, that it is hard of digestion, heavy in the stomach, and always affords bad juice; but these qualities are only applicable to such as live in ponds, and marshy places, and feed upon slime and mud. Jovius thinks the Pike has but an ordinary taste, and Ausonius does not esteem it; but its taste differs according to the country in which it is bred. The roe provokes vomiting, and sometimes purges violently. The Pike contains much oil, and volatile salt.

Mr. Lee, of Thelwell in Cheshire, had stored a pit; but when he laded it, in expectation of catching a great number of fish, to his disappointment he found only a large lean Pike, which had devoured all the store-fish, and had in his stomach a water-wagtail, and a young thristle, which were supposed to have been hopping on a twig near the water.

A Pike caught in Barn-meer (a large standing water in Cheshire,) was an ell long, and weighed thirty-five pounds; it was presented to lord Cholmondeley, who ordered it to be put into a canal in the garden, wherein were abundance of several sorts of fish. About twelve months after, his lordship drew the canal, and found that this overgrown Pike had devoured all the fish, except one large carp, that weighed between nine and ten pounds, and that was bitten in several places. The pike was then put into the canal again, together with abundance of fish with him to feed upon, all which he devoured in less than a year's time; and was observed by the gardener and workmen there to take the ducks, and other water fowl, under water; whereupon they shot magpies and crows, and threw them into the canal, which the Pike took before their eyes: of this they acquainted lord Cholmondeley, who thereupon ordered the slaughterman to fling in calves bellies, chickens guts, and such like garbage to him to prey upon; but being soon after neglected, he died, as supposed for want of food.

In the stew for preserving fish, at John Egerton's, Esq;

Esq; at Tatton in Cheshire, a large Pike was taken out, when there appeared at his mouth the tail of a fish, which being pulled out, proved to be another Pike, weight one pound, and was then alive.

In 1730, whilst Peter Bold, of Bold, in Lancashire, was netting some pits in Burton-wood, he saw a Pike lying amongst the weeds. Mr. Ralph Taylor, a gentleman who accompanied him, twice attempted to seize the Pike, but it escaped. Afterwards the pit was drawn, and a tench about five pounds weight pulled out; and so was this pike, with the tail of another hanging out of its mouth, which being measured with the other, proved nearly of equal size.

About the year 1740, when Robert Hyde of Cofnal, Esq; came of age, he had a large company of gentlemen to dine with him, to whom a fisherman brought three Pikes, one of twenty-three pounds, another of twelve pounds, and a third of four pounds, which he had caught by trolling in the Weaver: that of twelve pounds appeared in many places to have been bit, which he thus accounted for. Whilst he was drawing the fish to land, it was laid hold of by a larger Pike, which stuck fast, and was landed, but then quitted his hold and got away.

The Pike delights in a quiet, shady, unfrequented water, and lurks in the midst of weeds, flags, or bull-rushes: yet he frequently makes excursions from thence, and ranges about in search of prey: in cold weather he lies deep, and near the bottom, but as the weather grows warm he frequents the shallows. In a very hot, clear, sultry day, he may be seen lying on the surface of the water, but then you cannot tempt him with any bait. His best biting time is early in the morning and late in the evening, when there is a brisk wind, and where the water is clear. If they bite at all, they will take the bait at first; it is therefore useless to throw it often in the same place. He will take any sort of bait, except a fly; but the principal are young roach, dace, gudgeons, minnows, loaches and bleak: in July young frogs and Salmon-smelts are proper; and in winter the fat of bacon. Your baits in general should be fresh, sweet and clean, and if you expect to catch large ones, your baits must not be too small, otherwise you may spend a great deal of time to little purpose.

The best of the water-frogs for a Pike is the yellowest that can be got: and that your frog may continue long alive, put your hook into its mouth and out at his gills, and then with a fine needle and silk fasten the upper part of his leg with only one stitch to the arming-wire of your hook, or tie it gently above the upper joint to the armed-wire, being careful to hurt him as little as possible. There are several ways of fishing for a Pike, but the principal are trowing, trimmer-angling, and snap-angling.

In trowing, the line should be made of green silk, or thread, and should be forty yards long, or upwards, if the river is broad. Very great care should be taken that your line may run freely out; for if it knots, or entangles, and by that means checks the motion of the Pike as he runs away with the bait, he will let it go, and will not be prevailed upon to take it again very soon, unless he be extremely hungry. When you have fixed your bait on your hook, with as little damage to it as possible, cast it up and down such places as you imagine the Pike frequents, letting it sink a considerable depth before you pull it up again. When the Pike comes, you may sometimes perceive by a motion in the water, or at least you may feel him, which is the same thing. When this happens, your business is to give him line enough, that he may have free scope to go where he pleases, without the

least check, for the reasons above-mentioned. When he is got into his hold, there let him lie till you perceive the line move, and then you may conclude he has pouched the bait; then wind up your line till you think it is almost straight, and with a nimble jerk, contrary to the way the Pike takes, hook, and land him as soon as you can.

A trimmer is made use of in the still part of a river, or in a pond, meer, or canal. Your bait, which should be a young roach, dace, or gudgeon, may hang about mid-water, and may be left to itself while you are fishing elsewhere. By this artifice one person may do as much execution as if he had a companion along with him, with little or no additional trouble to himself.

A snap is generally two large hooks placed back to back, and a perch-hook in the middle to hang your bait upon. When you make use of it, take a gudgeon, dace, or small roach, and fix it to the small hook, by running it under the back fin; then let it swim down the current, and when you perceive the float to be drawn under water, you may conclude the Pike has laid hold of it; therefore give it a smart jerk, and without giving him time to play, keep your line always straight, drawing him towards the shore as soon as you can, without breaking your tackle, and then with your landing-net throw him out of the water. It will always be the most prudent method to have gimp or brass wire next your hook, and your line to be rather shorter than the rod.

Observe, that in trowing, the head of the bait-fish must be at the bent of the hook, and must come out at or near his tail. But the essential difference between these two methods is, that in the former, the Pike is always suffered to pouch or swallow the bait; but, in the latter, you are to strike as soon as he has taken it.

The common trowing hook, for a living bait, consists of two large hooks, with one common shank, made of one piece of wire, of about three quarters of an inch long, placed back to back, so that the points may not stand in a right line, but incline so much inwards, as that they, with the shank, may form an angle, little less than equilateral. At the top of the shank is a loop, left in the bending, the wire to make the hook double, through which is put a strong twisted brass wire, of about six inches long; and to this is looped another such link, but both so loose, that the hook and the lower link may have room to play: to the end of the line fasten a steel swivel.

There is however a sort of trowing-hook different from that already described, and to which it is thought preferable, which will require another management; this is no more than two single hooks tied back to back, with a strong piece of gimp between the shanks; in the whipping the hooks and the gimp together make a small loop, and take into it two links of chain of about an eighth of an inch diameter; and into the lower link, by means of a small staple of wire, fasten by the greater end a bit of lead, of a conical figure, and somewhat sharp at the point. These hooks are to be had at the fishing-tackle shops, ready fitted up. This latter kind of hook is to be thus ordered, viz. put the lead into the mouth of the bait-fish, and sew it up; the fish will live some time, and will swim with near the same ease as if at liberty. But if you trow with a dead-bait, as some do, let the shank be about six inches long, and leaded from the middle as low as the bent of the hook, to which a piece of very strong gimp must be fastened by a staple, and two links of chain; the shank must be barbed like a dart, and the lead a quarter of an inch square: the barb of the shank must stand like the fluke of an anchor, which is placed in a contrary direction to that of the

the stock. Let the gimp be about a foot long, and fix a swivel to the end of it. To bait it, thrust the barb of the shank into the mouth of the bait-fish, and bring it out at his side near the tail; when the barb is thus brought through, it cannot return, and the fish will be perfectly straight; a circumstance that renders the trouble of tying the tail unnecessary.

There is also another sort of trowling-hook, which is, indeed, no other than what most writers on this subject have mentioned; but the others here described are late improvements; and this is a hook either single or double, with a long shank, leaded about three inches up the wire with a piece of lead about a quarter of an inch square at the greater or lower end: fix to the shank an armed wire about eight inches long; to bait this hook, thrust your wire into the mouth of the fish, quite through his belly, and out at his tail, placing the wire so as that the point of the hook may be even with the belly of the bait-fish; and then tie the tail of the fish with strong thread to the wire. Some fasten it with a needle and thread, which is a neat way. Both with the trowl, and at the snap, cut away one of the fins of the bait-fish close at the gills, and another behind the vent on the contrary side; which will make it play the better. The bait being thus fixed, is to be thrown in, and kept in constant motion in the water, sometimes suffered to sink, then gradually raised; now drawn with the stream, and then against it; so as to counterfeit the motion of a small fish in swimming. If a pike is near, he mistakes the bait for a living fish, seizes it with prodigious greediness, goes off with it to his hold, and in about ten minutes pouches it. When he has thus swallowed the bait, you will see the line move, which is the signal for striking him; do this with two jerks, and then play him. Chuse to trowl in clear, and not in muddy water, and in windy weather, if the wind be not easterly. Some use in trowling and snapping, two or more swivels to their line; by which means the twisting of the line is prevented, the bait plays more freely, and, though dead, is made to appear as if alive; which, in rivers, is doubtless an excellent method: but those who chuse to fish in ponds, or still waters, will find very little occasion for more than one.

The Pike is also to be caught with a minnow; for which method observe the following directions. Get a single hook, slender, and long in the shank; let it resemble the shape of a shepherd's crook; put lead upon it, as thick near the bent as will go into the minnow's mouth: place the point of the hook directly up the face of the fish; let the rod be as long as you can properly manage, with a line of the same length, cast up and down, and manage it as when you trowl with any other bait: if, when the Pike has taken your bait, he runs to the end of the line before he has gorged it, do not strike, but hold still only, and he will return back, and swallow it: but if you use that bait with a trowl, it is preferable to all others. When you have struck him, be sure to have your line ready and slack, that he may take as much liberty as he will: for when he finds himself trepanned with the hook, he will exercise all his strength and cunning to get loose. As you feel him come easily towards you, you may be still drawing, till you feel him make resistance again: then let him have his swing till his fury is over; after which gather your line to you again till he starts away; and if you can get him to the top, it will sooner tire him: for the more he strives and throws himself from you, the sooner he will be weary. After this manner, by drawing him up, and letting him loose again, you may tame him till you bring him to shore, and land him by the net. But if you are unprovided with this convenience, beware

of attempting to take him out by the back or tail, but grasp him by the head, and put your fingers into his eyes. If you lay hold by his gills, your fingers may be injured with his bites.

The Pike is common in most of the lakes of Europe, but the largest are those taken in Lapland.

The SEA PIKE.

This fish is also known by the name of the Sea-Needle: its form resembles that of the river pike, but is proportionably longer and rounder. It is covered with small scales, and has an oblong conical snout. The colour of the inside of the mouth is between a yellow and a purple, and the jaws and tongue are furnished with teeth. The eyes, which are large, have each a silver coloured iris: the nostrils are wide and round. The tail is forked. The Sea Pike is an inhabitant of the Mediterranean.

NATURAL HISTORY of the ARGENTINE.

THIS is a small fish of a slender form, not unlike that of the pike. The back is green, and the sides, beneath the lateral line, are silvery. The nose is sharp-pointed, the eyes large, and the teeth very minute; the head is so transparent, that the brain may be seen thro' the skull. It is however principally distinguished from all other fish by the air-bladder, which is conical at both sides, and outwardly appears as if it was covered with polished leaf silver. This is used in the manufacture of artificial pearl. This fish is often seen in the fish-markets at Rome.

NATURAL HISTORY of the MULLET.

THE form of a Mullet resembles that of a dace: the head is almost square, and flat at the top; the nose is sharp, and the lips thick. It has large scales, not only on the body, but also on the head, and the covers of the gills. The back is of a bluish brown, and the belly white. The lateral lines are variegated alternately with black and white. The eyes have no other skin than their own coats, and the forward back-fin is radiated with five long spines. The mouth is destitute of teeth, but the tongue is roughish; and there are two rough bones on each side of the palate. This fish has also a bone beset with prickles, at each corner of the mouth: when at its full growth, it is about eighteen inches long. It visits the rivers in the southern parts of England, in the beginning of the summer with every tide, and returns back when the water ebbs. Those taken near Arundel, in Suffex, are said to be much superior to any others. The Mullet is an excellent fish for the table.

Mullets generally come in great shoals, and keep rooting in the sand or mud, like hogs. They are very sagacious, and when surrounded with a net, the whole shoal frequently escapes by leaping over it; for when one takes the lead, the others immediately follow. Oppian takes notice of this circumstance, and his observations are thus translated by Jones.

The Mullet, when encircling seines inclose,
The fatal threads and treach'rous bosom knows,
Instant he rallies all his vigorous pow'rs,
And faithful aid of ev'ry nerve implores;
O'er battlements of cork updarting flies,
And finds from air th'escape that sea denies.
But should the first attempt his hopes deceive,
And fatal space th' imprisoned fall receive,
Exhausted strength no second leap supplies;
Self-doom'd to death the prostrate victim lies
Resign'd, with painful expectation waits,
Till thinner elements complete his fates.

The Mullet was in great estimation among the Romans, and bore an exceeding high price. The price given for one in the days of Juvenal and Pliny is a striking evidence of the luxury and extravagance of that age.

The lavish slave
Six thousand pieces for a Mullet gave,
A sesterce for each pound. DRYDEN.

Asinius Celer, however, a man of consular dig-

nity, was infinitely more lavish than the epicure mentioned by Juvenal; for he gave eight thousand mummy, or sixty-four pounds eleven shillings and eight-pence, for a fish of so small a size as the Mullet. Such indeed was the luxury of the times, that there were stews in the eating-rooms, so that the fish could at once be brought from under the table and placed upon it; they even put the mullets in transparent vases, that they might be entertained with the various changes of its colour while it lay expiring.

C H A P. V.

Containing the NATURAL HISTORY of the FLYING FISH, the HERRING, the PILCHARD, the SPRAT, the ANCHOVY, the SHAD, the CARP, the BARBEL, the TENCH, the GUDGEON, the BREAM, the BUD, the ROACH, the DACE, the CHUB, the BLEAK, the WHITE BAIT, the MINNOW, the GOLD FISH, the LOBSTER, the CRAB, the TORTOISE, the TURTLE, the SEA SNAIL, FISHES of the OYSTER KIND, and the SEA URCHIN.

NATURAL HISTORY of the FLYING FISH.

IN shape and colour the Flying Fish nearly resembles that of a herring, but the eyes are larger in proportion. It has two pair of fins like wings; the greater of which are placed a little behind the gills, and the lesser about the region of the vent. The wings before are preceded with a small fin of six rays; and the upper part of the wings is of a dirty olive colour; but on the edge they are beautifully painted with round blue spots. By the help of these wings they arise out of the water, and fly a considerable way, to avoid the pursuit of the dolphins and other fishes that would devour them. Some authors say that they will fly for two hundred paces together, and fall down when their fins grow dry: in their flight, they go sometimes on one side, sometimes on the other, and are taken either in the water by gilt-heads, or out of it by sea-mews or cormorants. They are never taken by fishing for them; but will often fly into the ships that sail between the tropics. Nieuhoff says, that the Flying Fish is bluish on the back, but inclining to brown towards the tail; that it has large eyes, broad yellowish fins, and in shape resembles the smelt. Different authors, says a naturalist, having given different accounts of this fish, renders it highly probable, that there are several kinds of them. The flesh of them has a very agreeable flavour, and is very wholesome; which, very likely, may be the inducement to other fishes so frequently to pursue it. Mr. Ray affirms, that he has seen them frequently in the fish-markets at Rome, as well as in the islands of Sicily, and Malta, where they are brought for sale. The ancients were acquainted with this species: Pliny mentions it under the name of *hyrundo*, and speaks of its flying faculty.

NATURAL HISTORY of the HERRING.

HERRINGS differ greatly in size, but the usual length is from nine inches to a foot. The colour of the back and sides is green, varied with blue, and the belly is silvery. What principally distinguishes this fish from all others, is a scaly line that runs along the belly from the head to the tail. The scales are large, thin, and fall off with a slight touch. It has no spots, and the belly is sharp like a wedge. The eyes are very large; the

edges of the upper jaw and the tongue are very rough, but the whole mouth is void of teeth: the gill covers are very loose, and open wide; which occasions the immediate death of the fish when taken out of the water; whence the proverb arises, *as dead as a herring*. The tail is forked, and the swimming-bladder is of a silver colour.

The flesh of the herring is in great esteem, being fat, soft, and delicate; especially if it is dressed soon after it is taken.

Herrings are met with in vast shoals on the coast of America, as low as Carolina: they are also extremely numerous in the seas of Kamtschatka. Their great winter rendezvous is within the arctic circle; where they continue several months in order to recruit themselves after the fatigue of spawning; the seas within that space swarming with insect food, in a much greater degree than in our warmer latitudes.

Herrings begin to appear off the Shetland Isles in April and May; but the grand shoal make their appearance in June. Their number is so immense as to alter the appearance of the very ocean. They are divided into distinct columns of five or six miles in length, and three or four in breadth, and they drive the water before them with a kind of rippling: sometimes they sink for a few minutes, then rise again to the surface, and in fine weather reflect a variety of splendid colours.

Towards the end of June, Herrings are in full roe, and they continue in perfection till the beginning of winter, when they begin to deposit their spawn. The young Herrings approach the shores in July and August, and are then from half an inch to two inches in length. Very few young Herrings being found in our seas during winter, it is imagined, that they must return to their parental haunts beneath the ice, to repair the vast destruction of their race during summer, by men, fowl, and fish. Some few of the old herrings continue on our coasts the whole year, but their number is very inconsiderable.

The Herring fishery is of great antiquity: the Dutch first engaged in it about the year 1664: their diligence and skill gives them a superiority over us in that branch of trade even at this day; it is nevertheless a considerable article among the English. Yarmouth has long been famous for its Herring fair, which was regulated by an act in the 31st of Edward the Third: that town is obliged, by its charter, to send to the sheriffs of Norwich one hundred Herrings, to be made into twenty-four pies,

by them to be delivered to the lord of the manor of East Carleton, who is to convey them to the king.

This valuable fishery has not escaped the attention of the present generation. By the 28th of Geo. II. c. 14. it is enacted, that if any person shall damage or destroy, without the consent of the Society of the Free British Fishery, any of the nets, sails, cordages, stores, or other materials, belonging to the said society, he shall forfeit to the society treble value by distress; and for want of distress, to be committed to the house of correction for three months.

Immense quantities of these fish are annually taken, many of which are consumed whilst they are fresh, and the rest are salted, pickled, or smoak-dried, and are an edible article all over Europe.

Fresh Herrings, considered as a food, are said to be very good aliment, if used moderately; but, taken in quantities disproportioned to the powers of digestion, they produce a putrefaction in the stomach, of the alkaline kind, and are attended with very bad consequences. But pickled Herrings are very bad aliment, the flesh being rendered hard, and scarcely digestible by the vital powers. These, however, are less injurious than those that are salted and dried; these last being more hardened, and consequently less easily digested.

It was a question formerly, whether Herrings fed upon any thing besides water? but Lewenhoeck has made it evident, that they come every year in pursuit of worms and small fish, which at the time of their arrival abound in the channel; for when they have cleared the northern seas of their stock of provisions, then they travel southward, in search of a fresh supply.

The Dutch begin their Herring fishery on the 14th of June, in which they employ no less than a thousand vessels. These vessels are a kind of barks, called *busses*, carrying from forty-five to sixty ton, and two or three small cannon. None of them are allowed to stir out of port without a convoy, unless they carry twenty pieces of cannon among them all, in which case they are permitted to go in consort. Before they set out, they make a verbal agreement, which has the same force as if it was in writing. The regulations of the admiralty of Holland are in a great measure followed by the French, and other nations: the principal are, that no fisher shall cast his net within a hundred fathom of another's boat: that while the nets are cast, a light shall be kept on the hind part of the vessel: that when a boat is by any accident obliged to leave off fishing, the light shall be cast into the sea: likewise, that when the greater part of the fleet leaves fishing, and casts anchor, the rest shall be obliged to do the same.

The best times of fishing on the coast of Norfolk and Suffolk, near Yarmouth, Lestoffe, and Southwold, are from the middle of September till the middle of October. The nets that they use are about five yards deep, and twenty-five yards long: they sometimes fasten so many of these nets together as will take a mile in compass. They judge whereabouts the herrings lie by the hovering and motion of the sea-birds, which continually pursue them in expectation of prey. The fishers, as they row gently along, let their nets fall into the sea, taking their course as nearly as they can against the tide, that so when they draw their nets they may have the assistance of the tide. As soon as any boat has got its load, it makes to the shore, and delivers the Herrings to the man who is to wash and gut them. They distinguish their Herrings into six different sorts, as the fat Herring, which is the largest and thickest of all, and will keep about two or three months; the meat Herring, which is likewise large, but not so thick nor so fat as the former; the night-Herring, which is of a middle size; the pluck, which has received some damage from the nets;

the shotten Herring, which has lost its milk or spawn; and the copshen, which by some accident or other has been deprived of its head. All these Herrings are put into a tub with salt or brine, where they lie for twenty-four hours; when they are taken out and put into wicker baskets, and washed; after this they are spitted on small wooden spits, and hung up in a chimney built for that purpose, at such distances that the smoke may have free access to them all. When they have filled these places, which will hold ten or twelve thousand, they kindle the billets, which are laid on the floor, in order to dry them: this done, they shut the doors, all other air-holes being stopt before, and immediately the place is filled with smoke. This is repeated every quarter of an hour, insomuch, that a single last of Herrings requires five hundred billets to dry them. A last is ten barrels, each barrel containing near a thousand Herrings. These, thus prepared and dried, are called red Herrings.

The pickled Herrings are best done by the Dutch, who take them for that purpose about the summer solstice. The usual method of pickling them is this: as soon as the Herrings are taken out of the sea they are gutted and washed: then they are put into a strong brine, made with water and sea-salt, for fifteen hours; after this, they are taken out and well drained, and put in a regular order into barrels, with a layer of salt at the bottom of the barrel, and another at the top. Then take care to stop them up carefully that no air may get in, nor brine out, either of which would be prejudicial to the fish.

NATURAL HISTORY of the PILCHARD:

THE Pilchard greatly resembles the Herring, but differs from it in some particulars; it is a third part less, and the body is proportionably broader: it has a black spot near the upper corner of the gills, and the belly is not so sharp. It has no teeth, either in the jaws, the tongue, or the palate.

Pilchards appear in vast shoals off the Cornish coasts about the middle of July, and disappear at the beginning of winter; though a few of them sometimes return again after Christmas. This fishery employs a great number of men on the sea; and men, women, and children, on land, in salting, pressing, washing, and cleaning; in making boats, nets, ropes, casks; and all the tradesmen depending on their construction and sale. The usual quantities exported *each* year, for ten years, from 1747 to 1756, inclusive, on the average, is as follows: Fawy has exported 1732 hogsheds, annually; Falmouth, 14,631, and one third; Penzance and Mount's Bay, 12,149, and one third; St. Ives, 1,282: in all amounting to 29,795 hogsheds.

NATURAL HISTORY of the SPRAT.

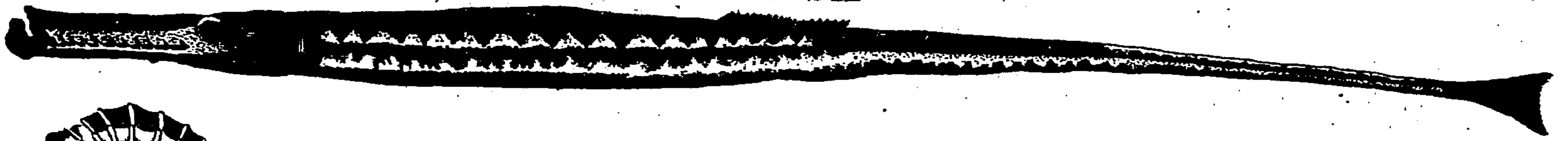
IT was supposed by Mr. Willoughby and Mr. Ray, that Sprats were the fry of the herring or the pilchard, as they exactly resembled either the one or the other in every particular except the size: Mr. Pennant, however, is of a different opinion, and says, that on comparing a Sprat and a young herring of equal size, some specific differences were discovered. He also observes, that the Sprats visit our coasts, and continue with us in shoals innumerable, when the young herrings have, in general, retired to the great northern deeps.

Sprats appear below bridge in the river Thames, early in November, and leave it in the month of March, and are, during that season, a great relief to the poor of the metropolis.

The Sprat seldom exceeds the length of five inches;

FISHES.

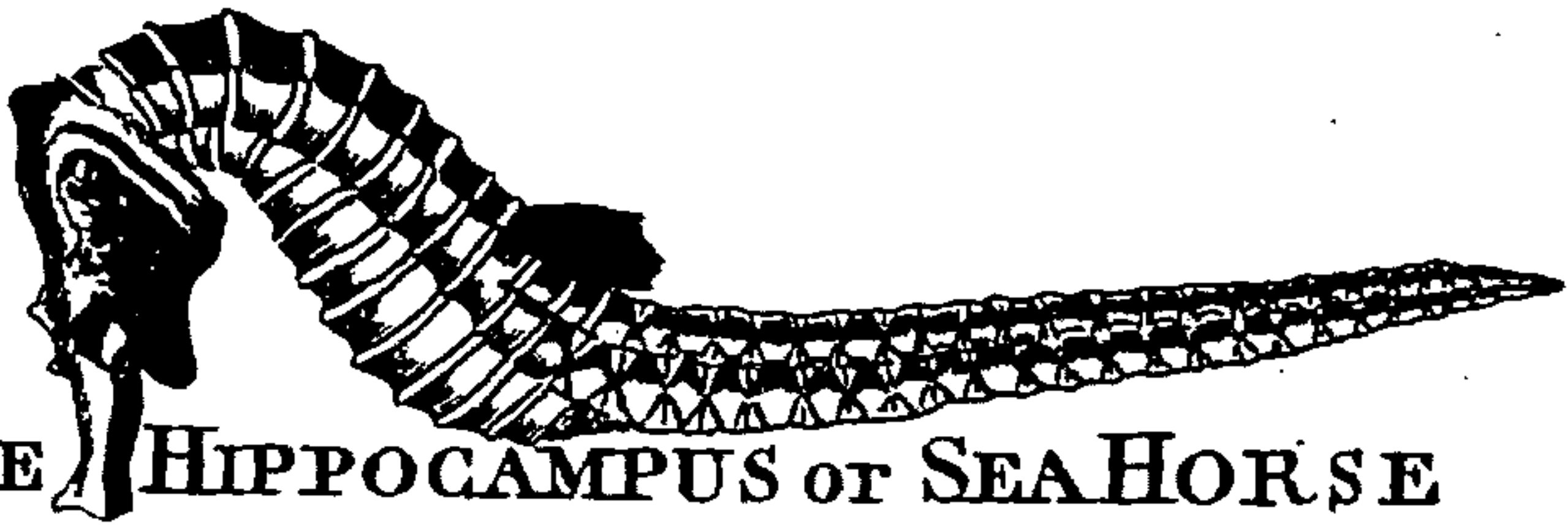
THE NEEDLE FISH



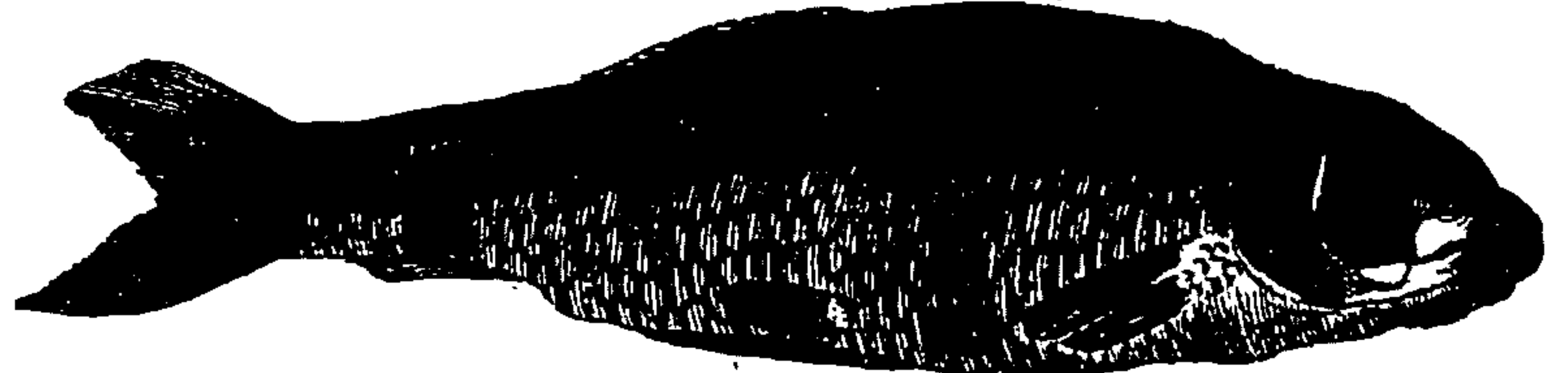
THE LESSER NEEDLE FISH



THE HIPPOCAMPUS or SEA HORSE



THE CARP



THE BEARDED LOACHE



THE LOACHE



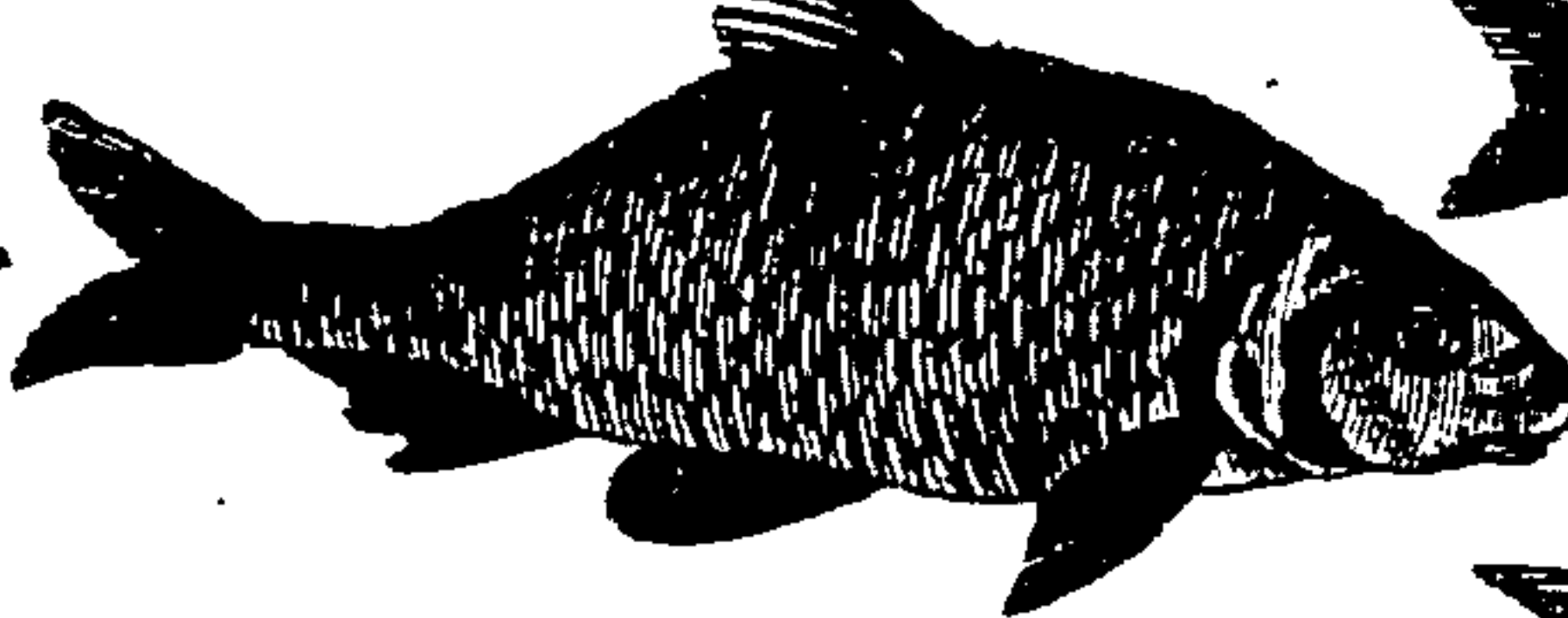
THE GUDGEON



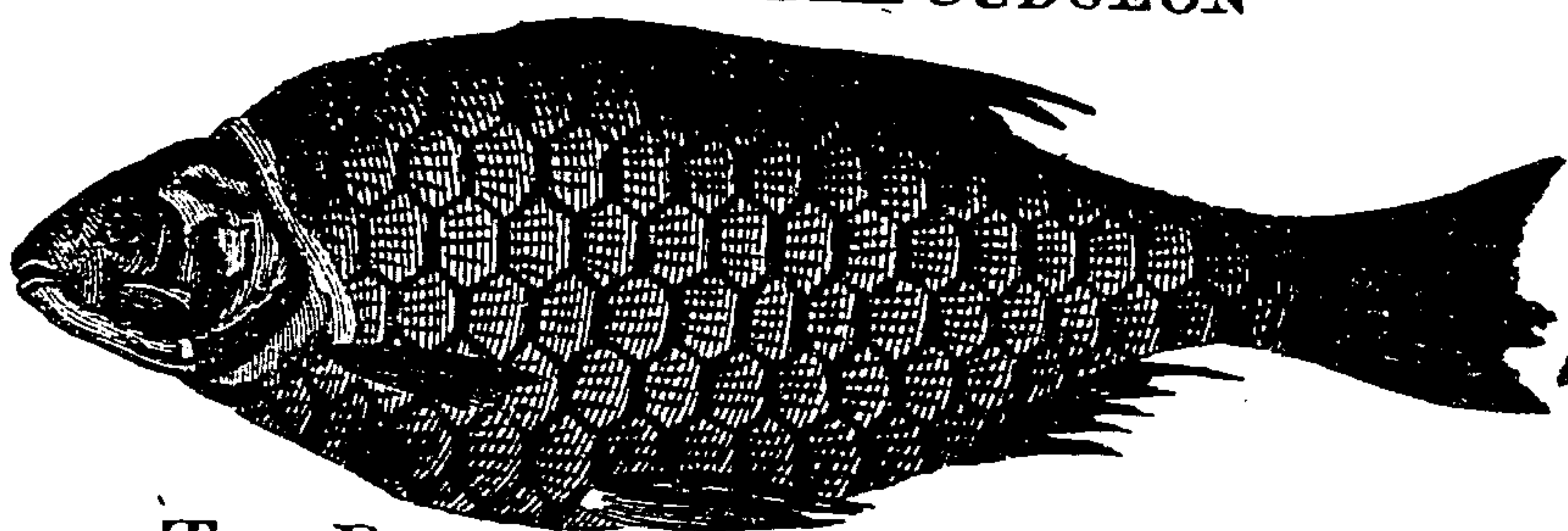
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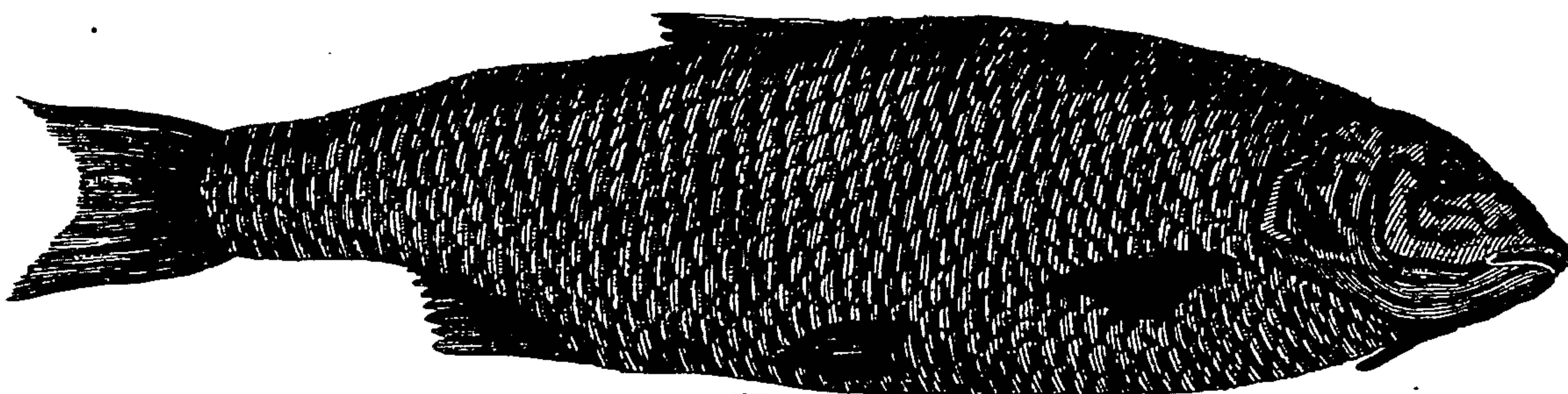
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THE ROACH



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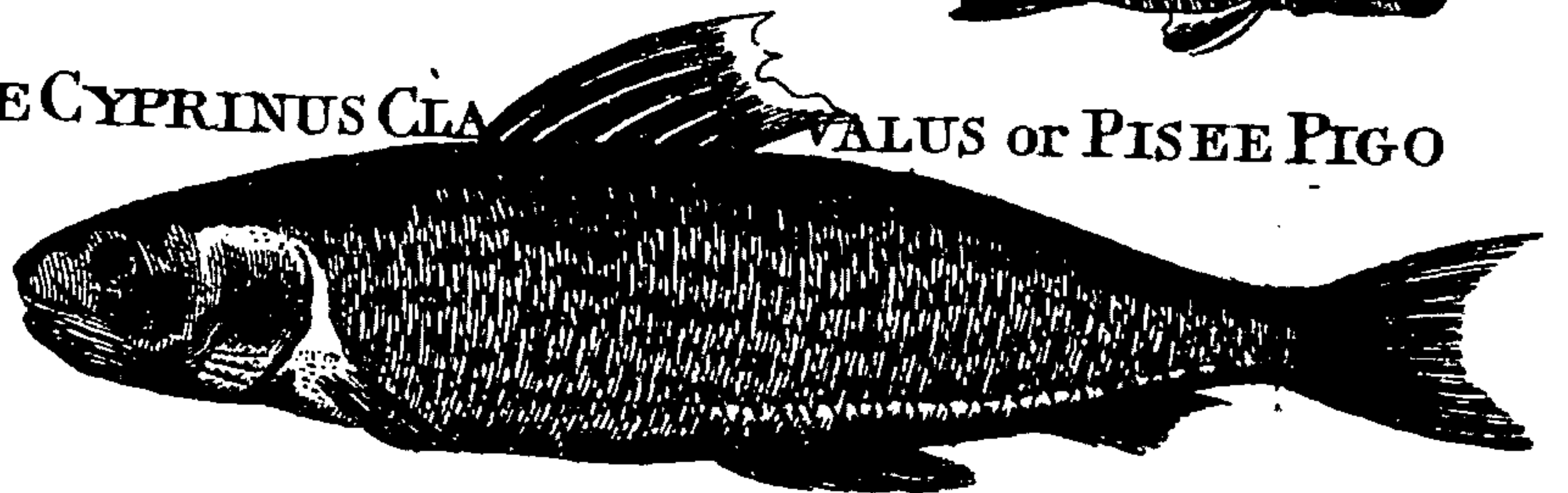


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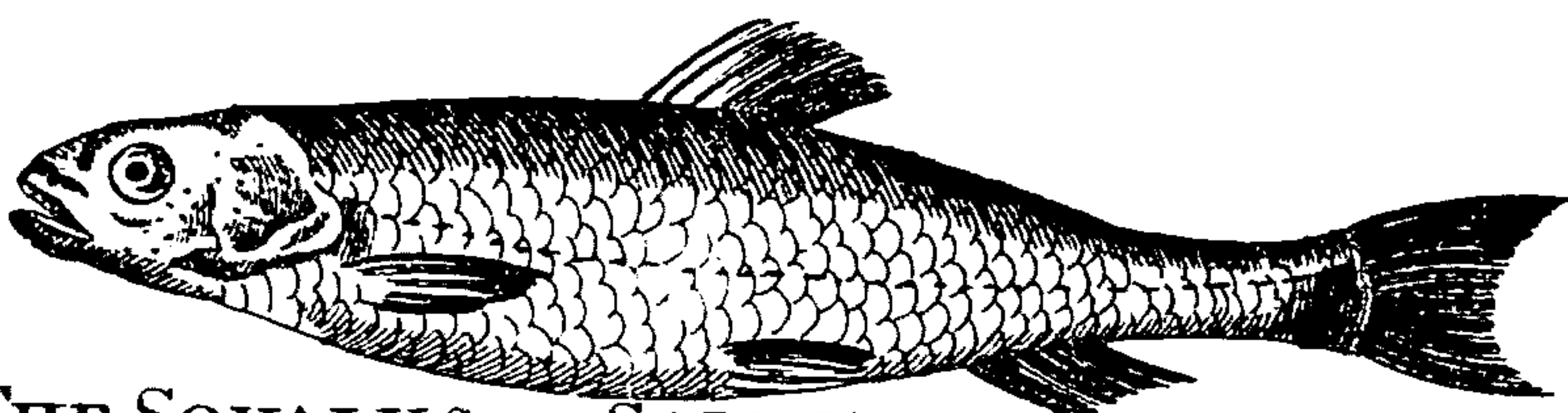


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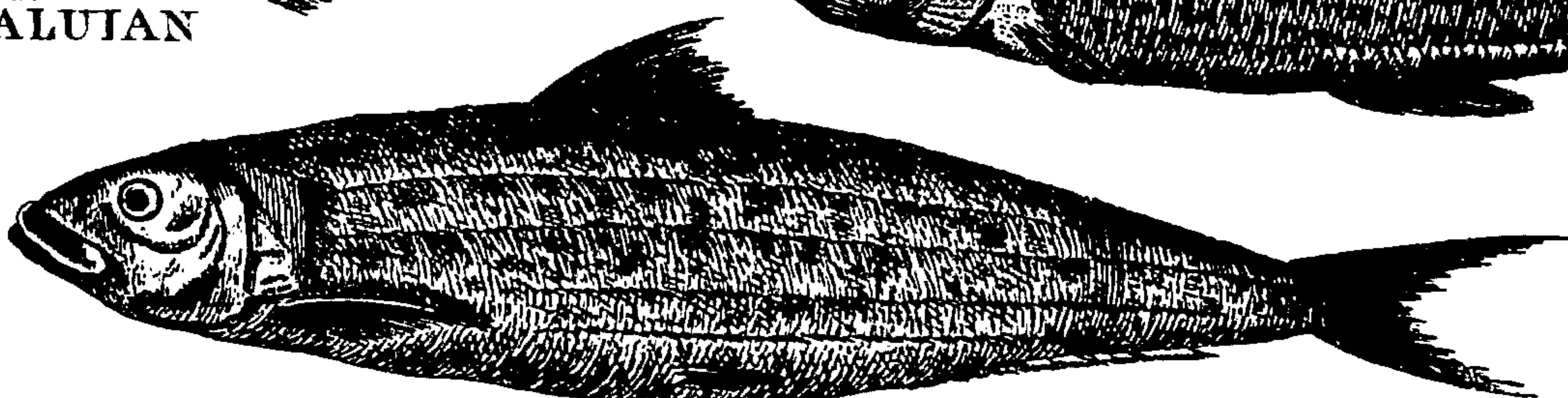
VALUS or PISEE PIGO



THE SQUALUS or SALUTAN



THE PILCHARD



THE ANCHOVEY



THE LYCOSTOMUS



THE SHAD



inches; and the body is proportionably deeper than that of a herring.

NATURAL HISTORY of the ANCHOVY.

THE Anchovy is about a palm in length, and almost of the colour of a sprat. The true Anchovies are taken in vast quantities in the Mediterranean, and are brought over here pickled. The body is rounder, and not so compressed as that of the herring: they are also transparent, except where the spine of the back prevents it: they have a sharp nose, and the upper jaw is longer than the lower: the mouth is extremely wide in proportion to the size of the fish: the eyes, and the apertures of the gills, are also very large. The Anchovy has this peculiar property, that it will dissolve in almost any liquor, when it is set over the fire.

There is a fish sometimes taken in the sea near Chester, which Mr. Ray, and some others, suspected to be the anchovy; but it is different from those taken in the Mediterranean.

The GOLDEN ANCHOVY.

This is an East Indian fish, and is so called on account of its shining golden colour. The mouth, which is very large and long, is armed with sharp teeth: the body is long, and almost as slender as that of the eel.

NATURAL HISTORY of the SHAD.

THE Shad differs from the herring in being broader, thinner, and more compressed on the sides: it is also larger than the herring, the general size being three or four pounds; though they sometimes weigh seven or eight pounds. On each side, near the gills, it has a large round black spot, and six or seven small ones, placed in a right line towards the tail; in which particular it agrees with the pilchard. The Shad enters the mouths of rivers, which herrings never do. The Severn affords the Shad in higher perfection than any other river. This fish makes its first appearance in April and May, according to the temper of the air: in very warm seasons it is always seen in April, and usually continues in the river about two months. The Severn Shad is a very delicate fish about the time of its first appearance, especially in that part of the river near Gloucester. The Thames Shad is reckoned a very coarse insipid fish: it does not frequent that river till the month of July. There is indeed so great a difference between the Thames Shad, and that of the Severn, that they can hardly be considered as the same fish.

NATURAL HISTORY of the CARP.

THE colour of the Carp, especially when full grown, is yellowish, and the scales are large: the head is short, like that of the tench, and the mouth is of a middling size, with fat fleshy yellow lips. It has no teeth in the jaws or on the tongue, but it has a triangular bone in the palate, and two other bones in the throat, which answer the purpose of teeth. It has a single barb on each side of the mouth, and another above those, which is shorter: the fins are large; the tail is broad, a little forked, and of a reddish-black colour: the lateral line is straight, and passes through the middle of each side.

There were no Carps in our ponds or rivers, till they were introduced here by Leonard Maschal, about the year 1514. Russia has none of these fish

at this day; Sweden has them only in the ponds of the people of fashion; but they abound in the rivers and lakes of Polish Prussia, where they are taken of a vast size. They are there a great article of commerce, and are sent in well-boats to Russia and Sweden.

Pliny says it lives in the sea; and we are credibly informed, that Carps are sometimes found in the harbour of Dantzick. They are very long lived. Gesner affirms, that he knew a man of good reputation, who assured him he had seen one of an hundred years old. They also grow to a very great size: a Carp was taken in the river Thames, near Hampton-court, that weighed thirteen pounds. Jovius says, Carps were sometimes caught in the Lacus Larius, of two hundred pounds weight; and, according to Rzaczynski, others have been taken in the Dniester, which were five feet in length. They are extremely tenacious of life, and have been kept alive out of water upwards of a fortnight, by being wrapped up in wet moss, with the mouth only remaining out. It should be hung up in a cool place, fed with bread and milk, and sometimes plunged into the water. By this treatment they grow fatter, and have a finer flavour than those which are immediately killed from the pond.

The Carp is a prodigious breeder: the roe has sometimes been taken out, and weighed with the fish itself, when the former has been found to preponderate. The Carp has perhaps the longest scales of any fish, in proportion to its bulk. Some of these are brown, and others yellow and white: the brown colour prevails in the largest scales; the middle are of a yellow and gold colour; but the white are small and silvered.

The flesh of the river Carp is much better than that of the pond, and in general it is more or less wholesome, according to the nature of the water in which they are bred, and consequently muddy stinking ponds produce the worst fish. It is soft, insipid, and not entirely free from viscosity. But curious eaters value it chiefly for the palate, or tongue, as they call it. The river Carp is not fond of a rapid stream, but delights in a still deep water, with a marly, or clayey bottom, especially if there be green weeds, which he is extremely fond of. A Carp exercises the angler's patience as much as any fish, for he is very shy and wary. They seldom bite in cold weather, and, in hot, a man cannot be too early or too late for them. But when they do bite, there is no fear of their hold.

Proper baits are the red-worm in March, the caddew in June, and the grasshopper in July, August, and September. But a recent discovery has proved a green-pea to be a bait inferior to none, if not the best of all; and that the best method to prepare them for use, is by half-boiling a sufficient quantity, and covering them with melted butter. In hot weather, he will take a lob-worm at top, as a trout does a fly: or, between the weeds, in a clear place, sink it without a float, about eight inches in the water, with only one large shot on the line, which is to be lodged on the leaf of some weed: then retire, keeping your eye upon the shot, till you see it taken away, with about a foot of the line, and then you may venture to strike; but keep him tight, and clear of the weeds. Great numbers of Carp have been taken in this manner.

In ponds, the best method is to throw six or eight slices of bread, to be carried with the wind, and in a short time, it is probable, you will see many fish feeding on it: if not, crumble a little very small, and cast it in where the slices rest; which will be a means to make them find the pieces at top; and after suffering them to feed on it, take a very long rod, a strong line, a middle sized hook, and one shot fixed just above the hook, and baited with about the size of a large

large horse-bean of the upper-crust of a rasped French roll, and you may pick out what size and quantity you please, by dropping your bait before the largest fish, as he is feeding on the slices at the top. This is a sure means of getting sport, and but little known. This fish, as already observed, is very cautious, and therefore your float must be small, and you must be sure to keep out of sight. And because when hooked he struggles in a violent manner, you must take care that your tackle be very good and strong, otherwise he will break from you.

Having fixed upon a place which you think a proper harbour for Carp, you should plumb your ground over-night, in order to find the depth of the water. Likewise at the same time bait the place with small bits of congealed blood, boiled malt, wheat, or rye, mixed with bran. The next morning early repair to the place as gently as you can, taking care, as mentioned above, to keep out of sight; when you have a bite, let the float sail away before you strike, and then do it strongly, and the contrary way to the motion of the float, and there will be less danger of pulling the bait out of the fish's mouth. When you have hold of him, if your tackle is good, you need not fear losing him, for he seldom breaks his hold. When you angle for a Carp, you ought not to forget your landing-net, which is by much the safest way of taking him out; otherwise play the fish till you draw it to the shallows, where you may fix your rod upright in the ground, at a proper distance from the river, and, putting both your hands under the fish, throw it on the shore.

If you are desirous of angling with a paste, the following is as good as any: take fine flour, a bit of lean raw veal, a little honey, and cotton-wool sufficient to keep the ingredients together, and beat them in a mortar to a paste. Or white bread mixed with cotton-wool, and worked into paste with some of the water where you are fishing, is not a despicable bait. Carp will take red currants, green figs, or almost any sort of bait. When you fish with a grasshopper, you must take off its wings, and let it sink into the water without lead or float. Gentles, two upon a hook, and throwing in chewed white bread, is a good method to angle for Carp, especially in a pond.

As the Carp is but indifferent food without excellent sauce, we beg leave to observe, that the following method is in high repute for dressing Carp.

Take a Carp, alive if possible, scour him, and rub him clean with water and salt, but do not scale him; then open him, and put him, with his blood and liver, into a small kettle; then take sweet marjoram, thyme, and parsley, of each half a handful, a sprig of rosemary, and another of savoury, bind them into two or three small bundles, and put them to your Carp, with four or five whole onions, twenty pickled oysters, and three anchovies. Then pour upon your fish as much claret as will cover him, and season your claret well with salt, cloves, mace, and the rinds of oranges and lemons; cover your pot, and set it on a quick fire till it be sufficiently boiled; then take out the Carp, and lay it with the broth into the dish, and pour upon it a quarter of a pound of fresh butter melted, and beaten with half a dozen spoonfuls of the broth, the yolks of two or three eggs, and some of the herbs shired: garnish your dish with lemons, and so serve it up.

NATURAL HISTORY of the BARBEL.

THE weight of the Barbel is generally about seven or eight pounds: though they are sometimes found of the length of three feet, and eighteen

or twenty pounds in weight. The back is of a palish olive colour, and the belly is silvery: the back and sides are marked with black spots; and the shape of the body is long and roundish; but the back is sharp and arched. The scales are not large, and the lateral lines run through the middle of the sides. The snout is sharpish, and the mouth is without teeth, like the rest of this kind. The upper jaw is longer than the lower, and it has two barbs on each side; one at the corner of the mouth, and the other on the side of the nose. The eyes are small, and their iris is either of a silver or a gold colour, spotted with brown. In summer their bellies are red. The flesh is soft, flabby, and extremely coarse: the Barbel is indeed the worst and coarsest of fresh-water fish. The roe is very noxious, affecting those who eat of it with a nausea, vomiting, purging, and a slight swelling. In summer, these fish move about in the night in search of food; but in autumn and winter they confine themselves to the deepest holes.

The Barbel is bred in most rivers; and the Thames, in particular, abounds with them. In the summer, he haunts the swiftest and shallowest streams, where he lurks under the weeds, and works and routs with his nose in the sand, like a hog. Yet sometimes he retires to bridges, flood-gates, locks, and weirs, where the waters are swift and deep. He never feeds off the ground, and will take any sort of worm, bits of bacon, old cheese, or new cheese, if kept in a linen rag, dipped in honey, two or three days, to make it tough. The watermen, who attend on you when you fish in their boats, sometimes provide graves, to be had at the tallow-chandlers, for a ground bait over night; yet they generally use the same worm that you bait with. They are very subtle, strong fish, struggling hard for their lives, and will often pick off your baits.

On the morning of August 23, 1771, Mr. Warren, the Perfumer, of Marybone-street, began to angle in Walton Deeps, and found such sport, that he stopped before noon, tired with fatigue, and found that he had caught two hundred and eighty pounds of large sized Barbel. This gentleman usually has the Deeps baited with worms over night, and in the morning fishes from a well boat, with a perfumed paste on his hook.

His time of biting is early in the morning, in June, July, and August, till ten o'clock, and from four in the afternoon, till sun-set; but September and October are to be preferred to any other months, because then they retire to the deep holes. In the summer they come to the shallows about sun-set, where they may be easily taken with a scoured lob-worm. Your rod must be very strong, with a tough whalebone at the end. You have no occasion for a float, but must put a large bullet on the line, that your bait may lie ledger. You must have ten hairs next the hook, but the remaining part of your line must be silk. If you make use of a wheel, as in trout-fishing, it will answer your purpose the better.

The most famous places near London, for Barbel angling, are Kingston-bridge, and Shepperton-deeps; but Walton-deeps, Chertsey-bridge, the small isle at Brentford, Hampton-ferry, and the holes under Cooper's-hill, are thought to be in no wise inferior: you may likewise meet with them at all the locks between Maidenhead and Oxford.

NATURAL HISTORY of the TENCH.

THE Tench seldom exceeds four or five pounds in weight in this island, but in some countries it has been found to weigh twenty. It is some-

sometimes called the physician of the fish, and it is said that the skin is so healing, that the wounded apply it as a styptic. Mr. Diaper, in his piscatory eclogues, says, that even the voracious pike will spare the Tench on account of its healing powers.

The Tench he spares a medicinal kind:
For when by wounds distressed, or sore diseased,
He courts the salutary fish for ease;
Close to his scales the kind physician glides,
And sweats a healing balsam from his sides.

It is a mucous, excrementitious fish, which delights in marshy and muddy waters. As to its medical uses, it is cut and applied to the wrists, and soles of the feet, in order to mitigate feverish heats, and to divert the venom of the pestilence; in like manner it is applied in pains of the head and joints. Live Tenches, applied one after another to the regions of the umbilicus and liver, and kept there till they die, are said to cure the jaundice; for they contract, it seems, a yellow colour.

There are two small stones in the head of the Tench, that have an absorbent, detergent, and diuretic quality. Whatever may be the uses of its slime to the inhabitants of the water, its flesh is certainly a wholesome and delicious food to those of the earth.

The Tench has a small head and nose in proportion to the size of the body; which is broad, thick, and short: the colour of the body is dusky; the dorsal and ventral fins are of the same colour: the head, sides, and belly, are of a greenish cast, beautifully mixed with gold, which is in its greatest splendour when the fish is in the highest season. The tail is blackish, somewhat square, and consists of nineteen rays: the eyes are small, seated on the sides of the head, and the iris is red. The Tench delights in still waters, and is seldom found in rivers.

The Tench delights so much in standing waters and ponds, and the still parts of rivers, whenever they are found there, for they seem to be the natives of standing water. However, they are said to breed in the rivers Stower, in Dorsetshire, and the Tiber, in Italy. Their time of spawning is the latter end of June, or the beginning of July; and they are in season from the beginning of September to the end of May. Most anglers declare, that this fish bites best in the three hot months; and yet others have found they will bite at all times, and at all seasons, unless after a shower of rain, but best of all in the night.

The best baits for this fish are a middling-sized lob-worm, or red-worm, well scoured, a gentle, a young wasp, a grub boiled, or a green grub; or you may use the clotted black blood in a sheep's heart, made with fine flour and honey into the consistence of an unguent; and your bait (when it is a red-worm) anointed with this, is by many preferred to other baits. But some have had more success with a red-worm dipped in tar, than any other. They bite almost in the same manner as the pond-carp, and will run away with your float; but when once you have hooked him, you are in no danger of losing him, if your tackle is but strong enough. The ground bait should be the same as for all pond fish, that is, either blood, or blood and grains mixed.

When the weather is very warm, you must fish about mid-water, gently pulling your bait almost to the surface, and then letting it down as slow as possible. Be not too eager in striking him when he bites, for as he delights in sucking the bait, allow him time and he will not quit it. Use a strong grass or gut, and a goose-quill float, without a cork, except in rivers, where the cork is always to be preferred.

No. 28.

Fish very near the ground; and if you bait with gentles, throw in a few at the taking every fish; which will draw them to your hook, and keep them together.

When you angle with a paffe, let a little tar be mixed with it. They bite best one hour before and after the sun rises and sets. In hot weather you may snare them at the top of the water, as the pike, with a double-wired link, not over-twisted, hung in a noose, tied to a line, on a long rod: let it fall softly before him on the water, without touching him, till you have brought it over his gills; then pull gently, and you have him.

NATURAL HISTORY of the GUDGEON.

THIS fish is generally found in gentle streams, and is about five or six inches long; with a round body, small scales, a brown or olive-coloured back, and a whitish belly: the iris is tinged with red; the gill-covers with green and silver; and at each corner of the mouth is a single barb. The tail is forked, and both that and the dorsal-fin are spotted with black. They bite eagerly to a proverb—hence the poet's observation—

What Gudgeons are we men!
Every woman's easy prey.

The Gudgeon grows to a much larger size in some rivers than in others. We have heard of one taken in that near Uxbridge, which weighed a pound. The flesh is in high esteem, and thought to be little inferior to that of the smelt.

The Gudgeon will bite all day from the end of March till Michaelmas, but not till an hour after sun-rise, nor longer than an hour before sun-set. You may sometimes have full as good sport an hour after sun-set, as at any time in the day.

The principal baits for the Gudgeon, are the small red-worm, gilt-tail, brandling, and a meadow-worm. He will likewise take a gentle, cod-bait, brood of wasps, or cow-dung bob; but the small red worm is what he is the fondest of. If you can find a bridge or plank over a small river, chuse to angle underneath for Gudgeons, for they love the shade: and are so far from being shy, that you may not only appear in sight, but if you drive them from their place of resort, they will immediately return. A single hair line, a fine taper rod, a float, and a small hook, is what is in general use, and the bait to drag on the ground. When you angle for them in the shallows, raise up the sand or gravel with a rake or pole, and it will draw the Gudgeons about your bait; when you have no such conveniency, throw in some handfuls of earth. Use a float, and let your bait always touch or drag on the ground.

When you angle for them in a boat in the Thames, let the waterman rake the gravel up to draw the Gudgeons about you; then plumb the ground, and bait your hook with a small well-scoured red-worm; by this method you will seldom fail of good sport. Your tackle, as for dace, with a well-scoured gilt-tail. There have been an hundred dozen, or more, taken at Metwell Weir, in the river Mersey, with angling, in one day; you may use two hooks at a line at a time, and two rods is not amiss; and then you may sometimes take perch or trout instead of Gudgeons.

NATURAL HISTORY of the BREAM.

THIS is a broad flattish fish, with a small squarish head, and a sharp nose. It is extremely deep and thin in proportion to its length: the top of the head is broad and flat; and the back, which

which rises like that of a hog, is of a dusky blue colour: the belly and sides are white: the scales are large, and the mouth, in proportion to the size of the fish, is very small, and without teeth: the iris of the eye is of a silver colour, and the pupil is small. This fish is an inhabitant of lakes, or the deep parts of still rivers. It is extremely insipid, and consequently very little esteemed.

Breams naturally feed upon slime, weeds, and dirt; but will take any sort of paste, the brood of bees or wasps, flies under water, and cod-baits. But a short well-scoured marsh-worm, or a large red-worm, will prove most successful, or the tail of a well-scoured dew-worm, or two or three large brandlings. They bite best when there is a breeze of wind, and require a great deal of baiting to keep them together. When the water is rough, your bait must be placed within a foot of the bottom. They are usually found in the deepest and broadest part of a river, early in the morning, and from three or four in the afternoon, till sun-set, when the weather is warm. They bite very slow, and the larger they are, the slower. As soon as you have struck one, he will immediately make to the bottom, and stay there some time; if he stays too long, give him a gentle touch, and he will immediately rise, and give two or three strong tugs; but when you have once turned him, he will soon yield.

The best method of angling for him is this: seek a shallow sandy bottom, that leads into a deep hole; then throw into the shallow part of the stream four or five handfuls of marsh-worms, cut in pieces, which will soon drive down into the hole. Use a long rod of proper strength, with a line proportionable; a small hook, and no float. The hook must be tied to India grass, on which put a cut shot six inches from the hook, and next to that a small bullet. The use of the shot is to keep the bullet from slipping lower. This done, bait your hook with a short well-scoured marsh-worm, throw in the shallow, and the stream will drive it into the hole. By this method you may catch more in two hours, than you can well carry away.

Another method often attended with success, is this: seek a deep hole near the bank, plumb the depth over night, and bait it at the same time with grains well squeezed, and mixed with blood. In the morning early visit the place again, and take your stand out of sight; bait your hook with a large red-worm, and drop it gently into the hole. With these precautions you will find sport. But remember always when you have occasion to plumb the depth of a place the night before, to take notice, at your return, whether the water be risen or fallen, and make an allowance accordingly. You may have very good sport, if you bait with chewed white bread, and angle with gentles, or the brood of wasps, but then you are not to use so long or strong a rod or line, and a smaller hook.

NATURAL HISTORY of the RUD.

THIS is broader than a roach, and thicker than a bream. The back is of an olive-colour; and the sides and belly of a gold colour, marked with red. The ventral and anal fins, and the tail, are generally of a deep red. The tail is also a little forked. The head is small, and the iris yellow, inclining to red. The scales are very large. This fish is in great esteem, and always in season, except in April, which is the time of spawning. It is found in the Rhine, in Germany; in the Charwell, near Oxford; and in the Witham, in Lincolnshire.

NATURAL HISTORY of the ROACH.

THE body of the Roach is pretty deep, but thin. The back, which is pretty sharply ridged, is of a dusky colour, and sometimes bluish: the belly is pale: the iris of the eyes, the fins and tail, are red. The tail is also forked. It is of a gold colour about the gills, and the mouth is round and destitute of teeth; it being a leather-mouthed fish. It breeds both in ponds and rivers, but those bred in the latter are the best, though the others are the longest. This fish and the dace are coarse and insipid meat.

Angle, as for dace or dace, with one gentle. They spawn about the middle of May, and recover their strength in a month's time.

When you angle for roach in a pond, throw in a little chewed white bread, and let your bait (which ought to be one large gentle) lie within six inches of the bottom, and you will not only take much larger, but more in number than you will by any other method. In winter you may fish for him with paste or gentles; in April with worms or cod-bait; but in very hot weather with very little white snails, earth-bobs, new cheese, or with flies under water, for he seldom takes them at the top, as the dace will; and this is the principal thing wherein they differ.

In August the Roach-fishery affords great diversion about London, where it is thus practised: any waterman will provide a boat, with rip-hooks, to fix it in the middle of the stream; and prepare your ground-bait, which is of bran and stale bread, mixed in balls, and thrown in, up the stream, with clay or small stones within, sufficient to sink it speedily, and lodge it at the bottom. Not more than three can conveniently fish in one boat. Your tackle must be strong, your float large, and heavy leaded, to sink the quicker. The constant bait is a well-scoured gentle, three at least on your hook, which must swim ten or twelve inches, at most, from the bottom. The best times are, from half-ebb tide, to within two hours of high-water: and the best places are, the whole sand-bank in the middle, facing the Tower; that opposite the Temple; before Whitehall; and against Chelsea-church. At these places you will find plenty of sport. Some, with very good success, pick out some stand upon the shore, among the chalk-stones, at the banks of the Isle of Dogs, near Limehouse, under the wind-mills, and fish there in the same manner, from dead-ebb, till within an hour or more of high-water, retiring backwards as the flood comes in.

There is also another highly-approved method of this diversion below-bridge, called stern-fishing, by fastening a boat at the stern of any collier or vessel that has lately been a voyage, and has her bottom foul, which contains insects and food for the fish; use about two joints of your rod at most, and a line not longer than four feet, your float fixed within twelve inches of the top of it. Angle there with three or four gentles on your hook at a time, and lay in as close to the ship's stern as you can, letting it swim about three yards. In this you use no ground-bait. You must begin when the tide first ebbs, and for two hours, at least, you will not fail of catching many fish (roach and dace) and those very large ones.

In Thames angling, you must not attempt when there is a cold and raw air, high wind, rough water, or wet weather, or when there are spring-tides, or the land-floods come down. At the chalk-hill, and about the piles of London-bridge, there is excellent sport when the tide is low. Be always careful to pitch your boat on that side the river that is most under the wind.

NATURAL

NATURAL HISTORY of the DACE, or DARE.

THE Dace haunts the same places as the roach, and is a great breeder. It is a very lively fish, and in summer delights in frolicking near the surface of the water. The back is varied with dusky and blue; the sides and belly are silvery, and the tail is much forked. It resembles a chub, though it is smaller and somewhat whiter. The iris of the eye is yellow.

The flesh of the Dace is sweet, soft, and of good nourishment, but is in no great esteem. They spawn in February and March, and are fit to eat in April and May; but their highest season is from September to the latter end of February. They delight in gravelly and sandy bottoms, and the deepest part of the river under the shade of trees, or dock-leaves.

It is a very simple fish, and will often bite when you least expect it. However, their darling bait is a gentle at the bottom, and a small fly at the top. In the summer months an ant-fly is best. They will likewise take any paste, as well as all sorts of small worms.

Angle for him with a very slender rod, a line of single hairs from the top to the hook, which is to be a very small one; one small shot, a float made of two sea-gull quills, cut within about half an inch of the feather, and thrust one of the open ends into the other, and then whipt fast with fine waxed silk. This makes the very best float, and is drawn under the water without danger of pricking the fish. When you are so provided, get some white bread, and chew it, and throw it into the water in small pieces, and bait with gentles, you will have good sport: or you may fish with boiled malt, and bait with grains, and you will frequently catch chub, bream, and many other sorts of fish. He will likewise take all sorts of flies very well. If you point your hook with one gentle in the spring, he takes an earth-bob very well.

If you angle where two mill-streams are going at one and the same time, let it be in the eddy between the two streams: first make use of your plummet; and if the water be deep, you must angle within a foot of the bottom, and perhaps you will find but little sport. But if it proves to be shallow, that is, about the depth of two feet, or not exceeding three, then bait your hook with three large gentles: use a cork float, which ought not to be a foot and a half from the hook, and have a quick eye to strike at the very first bite; for if there be any large Dace in the mill-pool, they will resort to the eddy between the two streams.

NATURAL HISTORY of the CHUB.

THIS is a very coarse fish, and full of bones: it has a large blackish head, and its body is longer than that of the carp. The back is of a dark green, and the belly and sides of a silver colour: the temples are yellowish, and the scales, like those of the carp, are large and angular. The iris of the eyes is of gold and silver colours. The tail is forked, and the fins are of a blackish blue; though sometimes they are tinged with red. The belly is broadish, and the lateral lines run parallel to the bottom of the belly. The Chub is a very timid fish, sinking to the bottom on the least alarm. It does not grow to a very large size; though they have been known to weigh upwards of five pounds.

In August, and in the cooler months, a yellow paste, made of the strongest cheese, and pounded in a mortar with a little butter, and so much saffron, as being beaten small, will turn it to a lemon colour, is a very good bait. In the winter months, the

Chub is esteemed the best, it being observed, that the forked bones are then lost, or turned into a kind of gristle, especially if the fish is baked. Some make a paste for this season of cheese and turpentine. He will also bite at a minnow, as well as the trout. But take this for a rule in chub-fishing, that in hot weather he is to be angled for towards the mid-water, or near the top; and in colder weather near the bottom. And if you fish for him near the top, with a beetle or fly, be careful to let your line be very long, and to keep out of sight. The spawn of this fish is excellent meat; and the head of a large chevin, the throat being well washed, is the best part of him. The flesh is white, soft, and insipid, and is but in very little esteem among the generality of people. The Chub is very fond of a large bait. In the summer, at mid-water, five or six cabbage, nettle, or cattle dock-grubs, or a mixture of all or any of the above, mixed with flies, are very good baits.

The Chub usually swims in mid-water, and sometimes at the top, and therefore is best taken by dibbing. From the beginning of May to September, you may angle for him before the sun rises till nine, and in June, July, and August, from five till dark, and with the white moth all the night over; but in the winter he lies lower, and then you may fish for him at the bottom in the middle of the day, with new cow-brains. Some people will chew and spit them into the hole where they fish; but if you can mix them very small in a cup with a little water, and throw a small quantity in at a time, you will have sport, if you bait with the same; this, and the spinal marrow of an ox, is the very best winter bait. They will take almost any bait, as the brains of oxen or sheep dried, and cut into small pieces; all sorts of worms, gentles, the brood of wasps, blackberries, dewberries, new cheese, grasshoppers, black snails with their bellies slit, and all sorts of paste.

In dibbing, the Chub will take a black ant-fly, small butterflies with the great wings cut off, oak-worms, ash-flies, green caterpillars, and the cod-bait; in short, there is scarce any thing comes amiss to him. It is but a cowardly fish, and when once turned, yields presently. But you must master it as soon as you can, because when he is hooked, he does not make to the middle of the stream, but to the banks, which may endanger your tackle. When you throw your bait into the water, they fly from it, but return immediately to see what it is, and, if they like it, they swallow it without hesitation, if you keep yourself out of sight.

This fish will afford good sport, if you do as follows. Go to one of their holes, where, in most hot days, you may find a number of them floating near the top of the water. Get two or three grasshoppers as you go over the meadows, and place yourself secretly behind a tree, remaining as free from motion as possible. Put a grasshopper upon your hook, and let your hook hang a quarter of a yard short of the water; to which end you must rest your rod on some bough of a tree. It is probable the Chub will sink down towards the bottom of the water at the first shadow of your rod, they being the most fearful of fishes, and apt to do thus if but a bird flies over them, and makes the least shadow on the water: but they will presently rise up to the top again, and there lie floating till some shadow frights them afresh: when they lie thus upon the top of the water, fix your eye upon the best Chub you can single out, and move your rod gently towards him. Let your bait fall easily upon the water, three or four inches before him, and he will infallibly take it, and you will be as certain to catch him; for he is one of those leather-mouthed fishes, of which a hook scarce ever loses its hold: but be sure to give him play enough, before you offer to take him out of the water. When a grasshopper cannot

cannot be found, a black snail, with his belly slit, to shew his white, or a piece of soft cheese, or any sort of natural flies, will usually do as well.

When you angle for him with a fly, let it be a very large hackle, and point your hook with four or five large gentles, or botts; cast your line, which ought to be fourteen or fifteen yards long, across the stream, and let the current carry it down, as they will take a fly much better a little under water than at top. When you see your line draw, strike pretty smart. Your rod should be six yards, and not too slender. A small lamprey is no bad bait for a Chub.

NATURAL HISTORY of the BLEAK.

THE Bleak seldom exceeds six inches in length: the body is broadish, and not unlike that of a sprat; the head small; the scales are thin, and of a silver colour, and come off easily. The back is of a bluish or greenish brown, and the eyes are large, marked on the lower side with a blood-coloured spot. The skull is transparent, and the flesh is sweet, delicate, and nourishing. Artificial pearls are made with the scales of the Bleak. They are beat into a fine powder, then diluted with water, and introduced into a thin glass bubble, which is afterwards filled with wax. This art was invented by the French, and one artist in Paris has been known to use thirty hampers full of fish in his manufacture in one year. At certain seasons of the year, these fish seem to be affected with the vertigo: they are seen tumbling about near the surface of the water, and are then called mad Bleaks by the Thames fishermen.

The Bleak spawns in March, and recovers its strength in three weeks. The flesh is sweet, nourishing, and pleasant, but little sought after on account of the diminutive size of the fish.

The best baits for him in the cold months, are gentles and small red-worms, and in summer you may catch great numbers with an artificial ant-fly, or a very small gnat. There cannot be better sport than whipping for Bleaks, in a boat, or on a bank, in the swift water, in a summer's evening, with a hazle-top, about five or six feet long, and a line twice the length of the rod. Point your hook with a small gentle. As this fish is always changing its situation, and seems to be ever restless, and ever in motion, the best method of angling for him is with a pater-noster line; that is, a line with half a dozen or more hooks, tied to the main line, about three or four inches above one another. He will take your bait wherever he meets it.

NATURAL HISTORY of the WHITE BAIT.

VARIOUS are the conjectures about this species; the general opinion however is, that they are the fry of some fish. Some attribute it to the bleak, others to the shad, the sprat, and the smelt. It bears a greater similarity to the bleak than to any other, but it is impossible for us to class it with any degree of certainty. In the months of July and August, innumerable multitudes of these fish are taken in the Thames, near Blackwall and Greenwich. They are esteemed very delicious when fried with flour, and the taverns contiguous to those places are much resorted to, when the White Bait are in season, by the lower order of epicures. The head, back, and sides of this fish are silvery, and the back tinged with green. Its usual length is about two inches. It is remarkable, that these fish expire the very instant they are taken out of the water. A wager was laid in the summer of 1775,

that a person could not shew a live White Bait above London-bridge. The experiment was tried, a well-boat was procured, and some hundreds of these little fish poured into it the instant they were taken out of the Thames; the utmost expedition was then used to get to the west side of London-bridge; after which the fish were immediately inspected, and not one of them remained alive.

NATURAL HISTORY of the MINNOW.

THE Minnow is much smaller than the gudgeon, having a roundish body, and seldom exceeds three inches in length. Its body is smooth, and the scales are so small as to be hardly visible. The back is flat, and of a deep olive colour: the belly and sides are mottled with scarlet in some, in others white, and in others with a shining blue. The tail is forked, and marked near the base with a dusky spot. These beautiful fish appear in shoals in many of our small gravelly streams.

NATURAL HISTORY of the GOLD FISH.

THE Gold Fish was first introduced into this country about the year 1691, but were not generally known till 1728, when many of them were brought to England. In China Gold Fish are kept for amusement by every person of fashion, either in porcelain or glass vessels, or in the small basons that decorate the courts of the Chinese houses. The form of the Gold Fish resembles that of the carp; they have been seen in England of the length of eight inches, and Du Halde informs us, they grow to the size of our largest herring in their native country. In the colours of this fish there is infinite variety: some are marked with a fine blue, a brown, and a bright silver; but the general and predominant colour is gold of a most amazing splendour. This species is particularly distinguished by the anal fins, which are placed opposite each other like the ventral fins; and not behind each other, like those of other fish.

Of the DIVISION of SHELL-FISH.

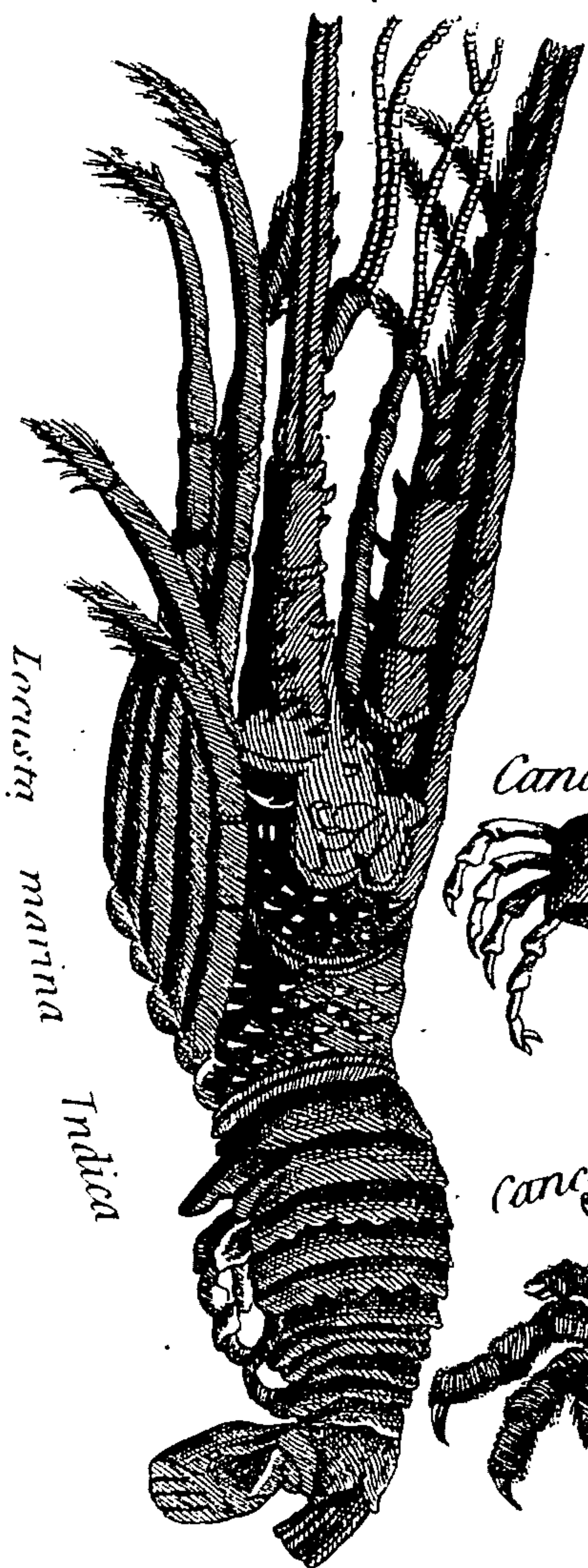
THESE are usually divided, by naturalists, into crustaceous and testaceous animals. Crustaceous fish, such as the crab and the lobster, are furnished with a shell that is not of a stony hardness, but is in some measure capable of yielding. Testaceous fishes, like the oyster or cockle, are furnished with a shell of a stony hardness; which is brittle, and incapable of yielding. The lobster, the crab, and the tortoise, are of the crustaceous kinds: the numerous tribe of oysters, muscles, cockles, and sea-snails, which offer infinite variety, are of the testaceous kinds.

NATURAL HISTORY of the LOBSTER.

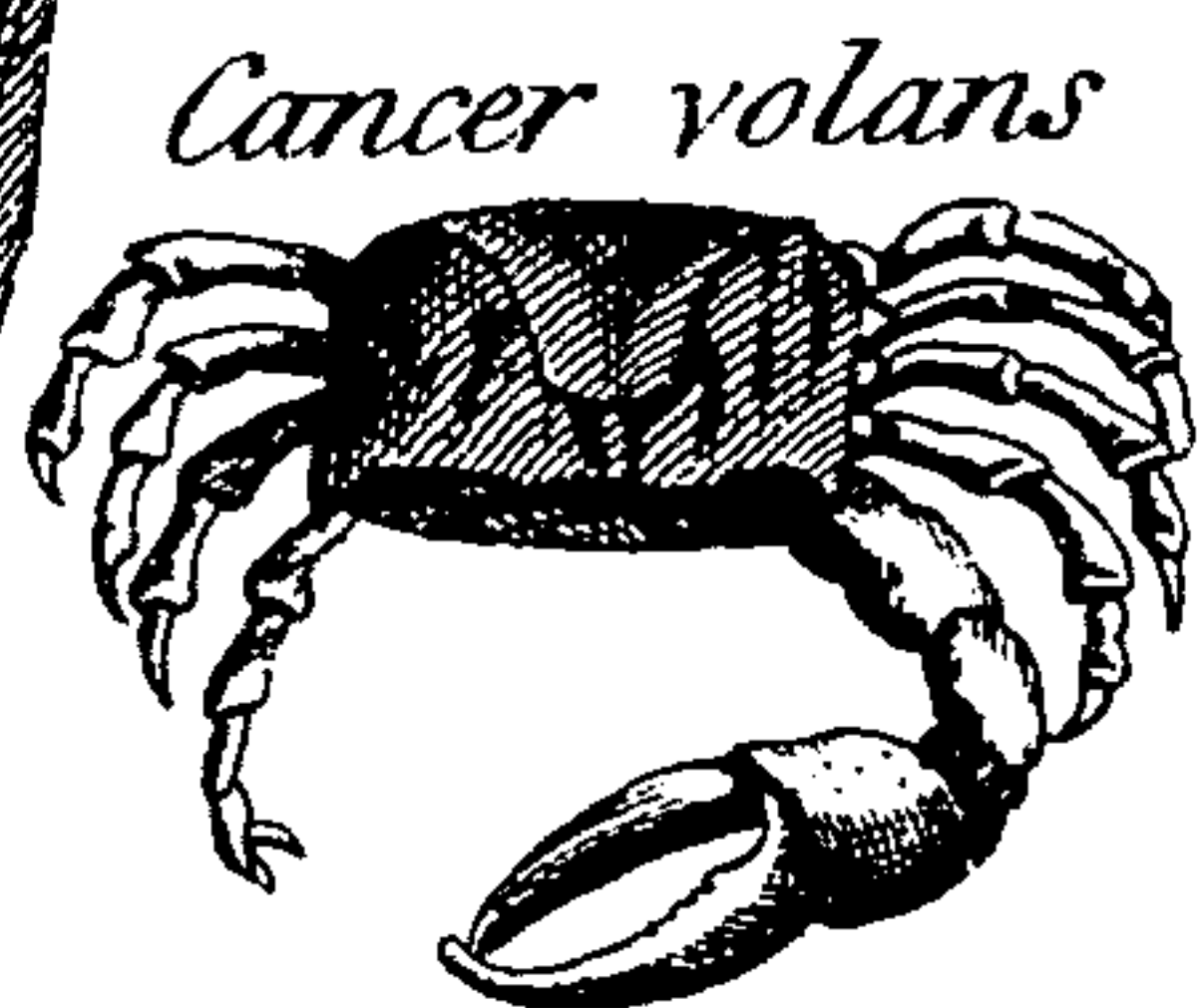
THE Lobster and the crab, however different in figure, are nearly the same in manners and conformation. Though without any warmth in their bodies, or even without red blood circulating through their veins, they are animals wonderfully voracious: they seize upon every thing that has life, and whatever they attack is sure to perish, tho' never so well defended. These voracious animals even devour each other; and they may, in some measure, be said to eat themselves; as they annually change their shell and stomach, and their old stomach is usually the first repast for the new one.

The

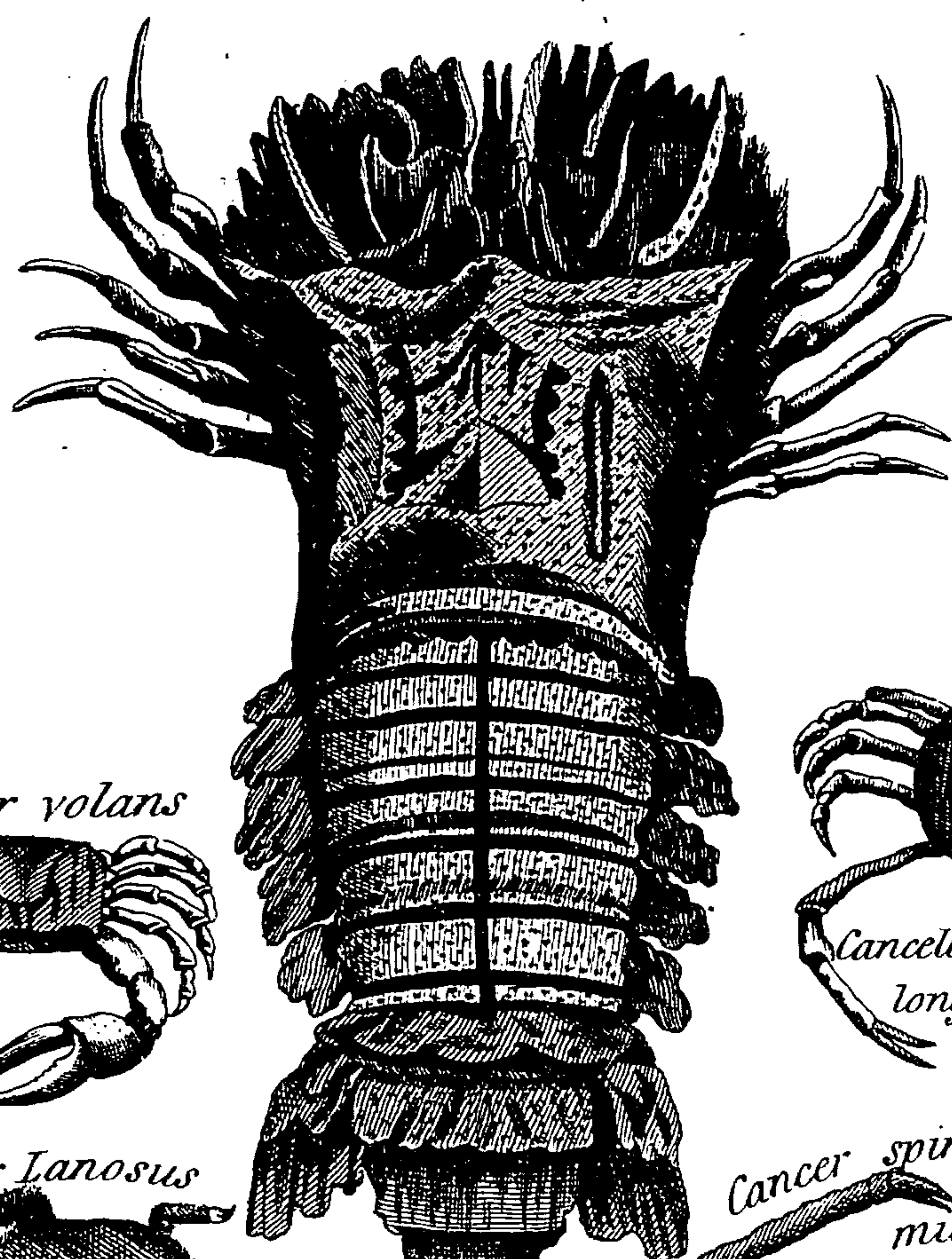
CRUSTACEOUS ANIMALS



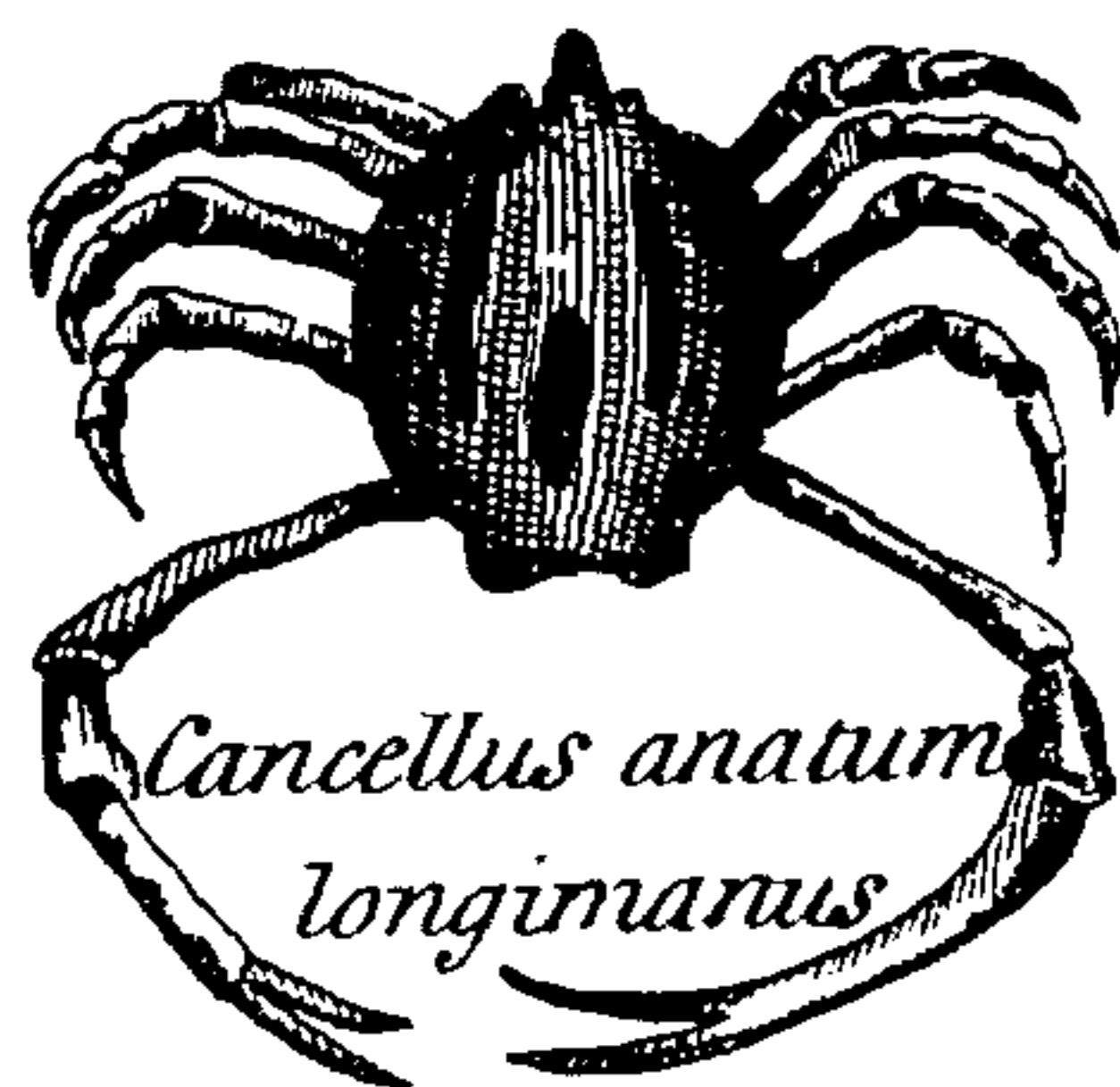
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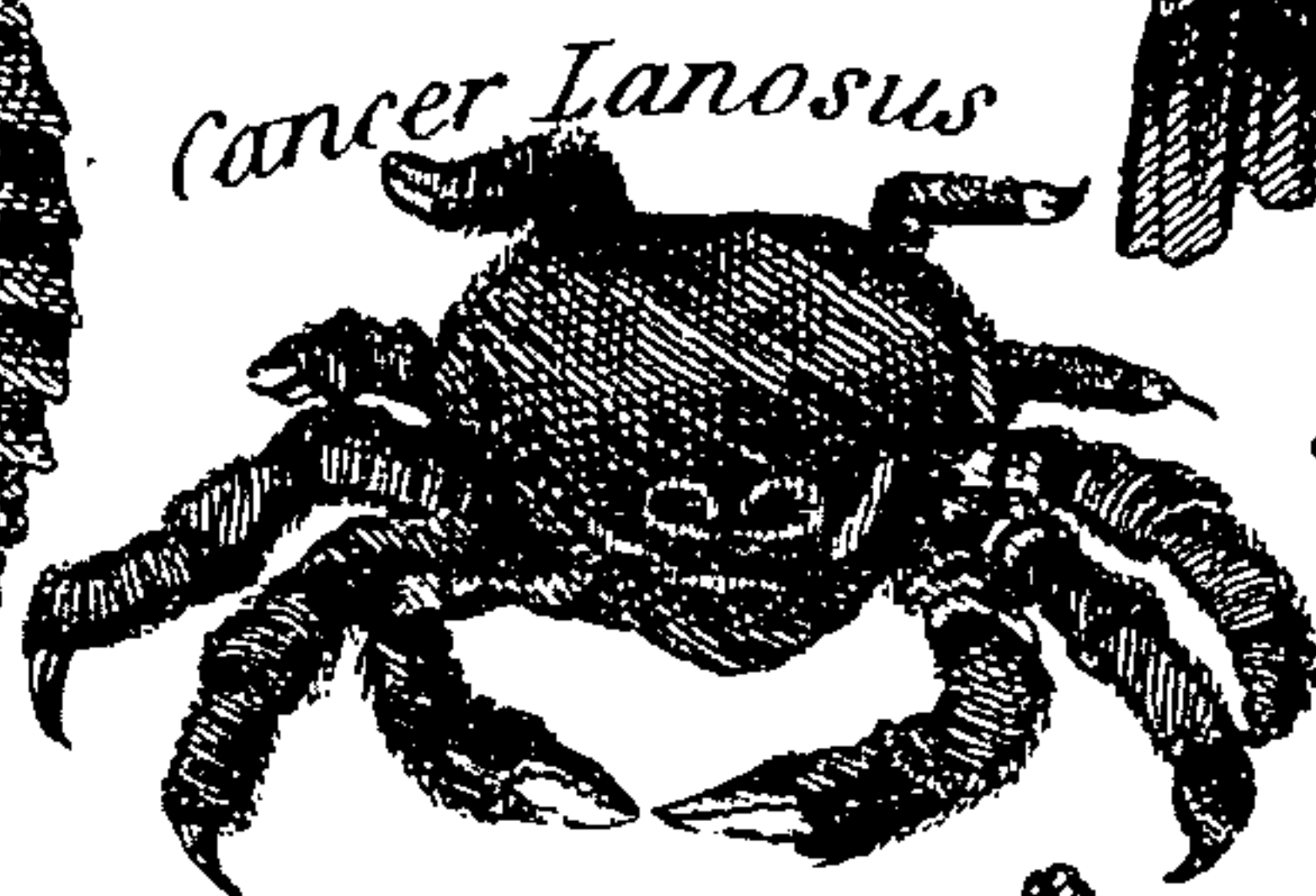
Cancer volans



Squilla lata



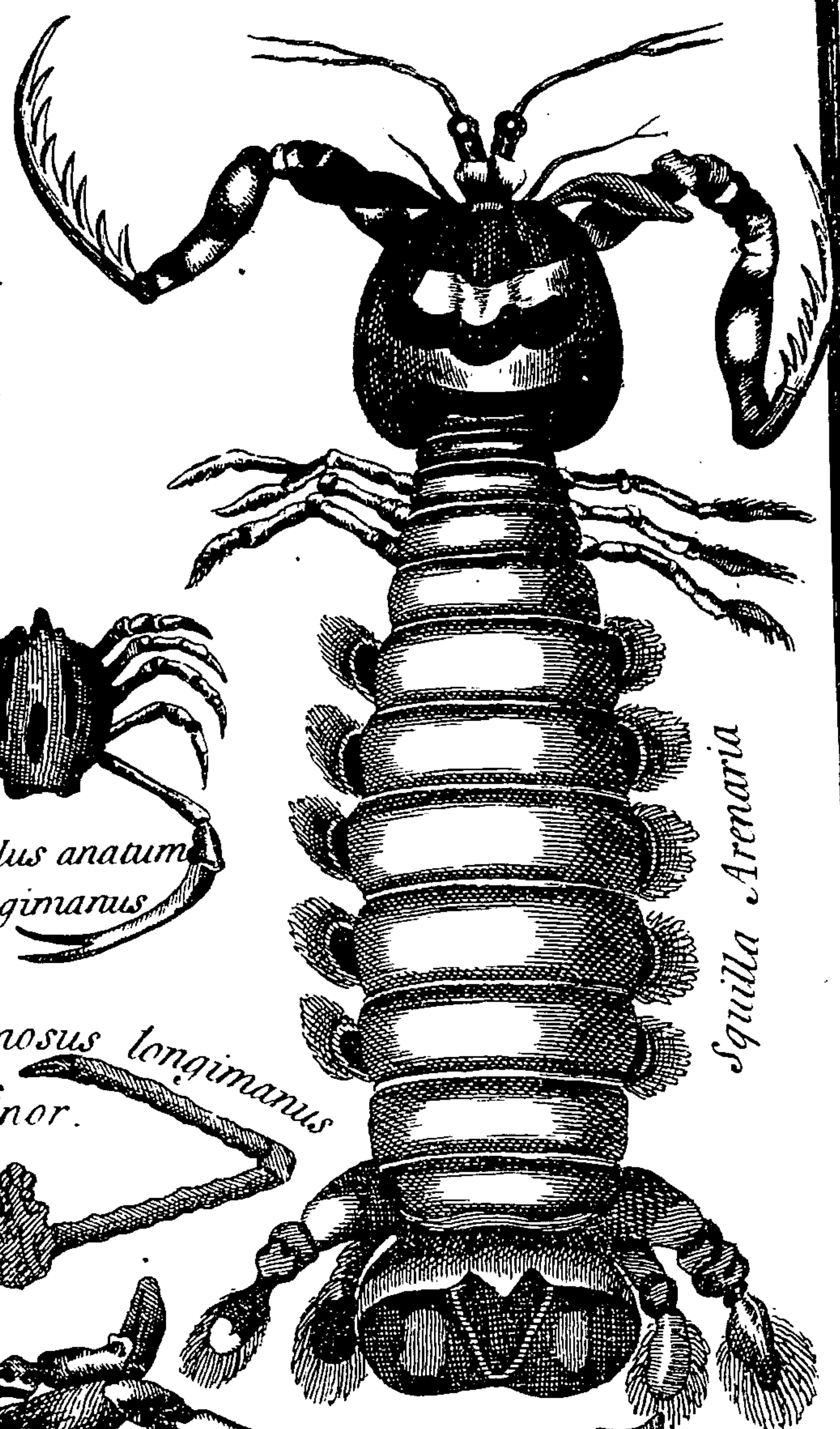
Cancellus anatum longimanus



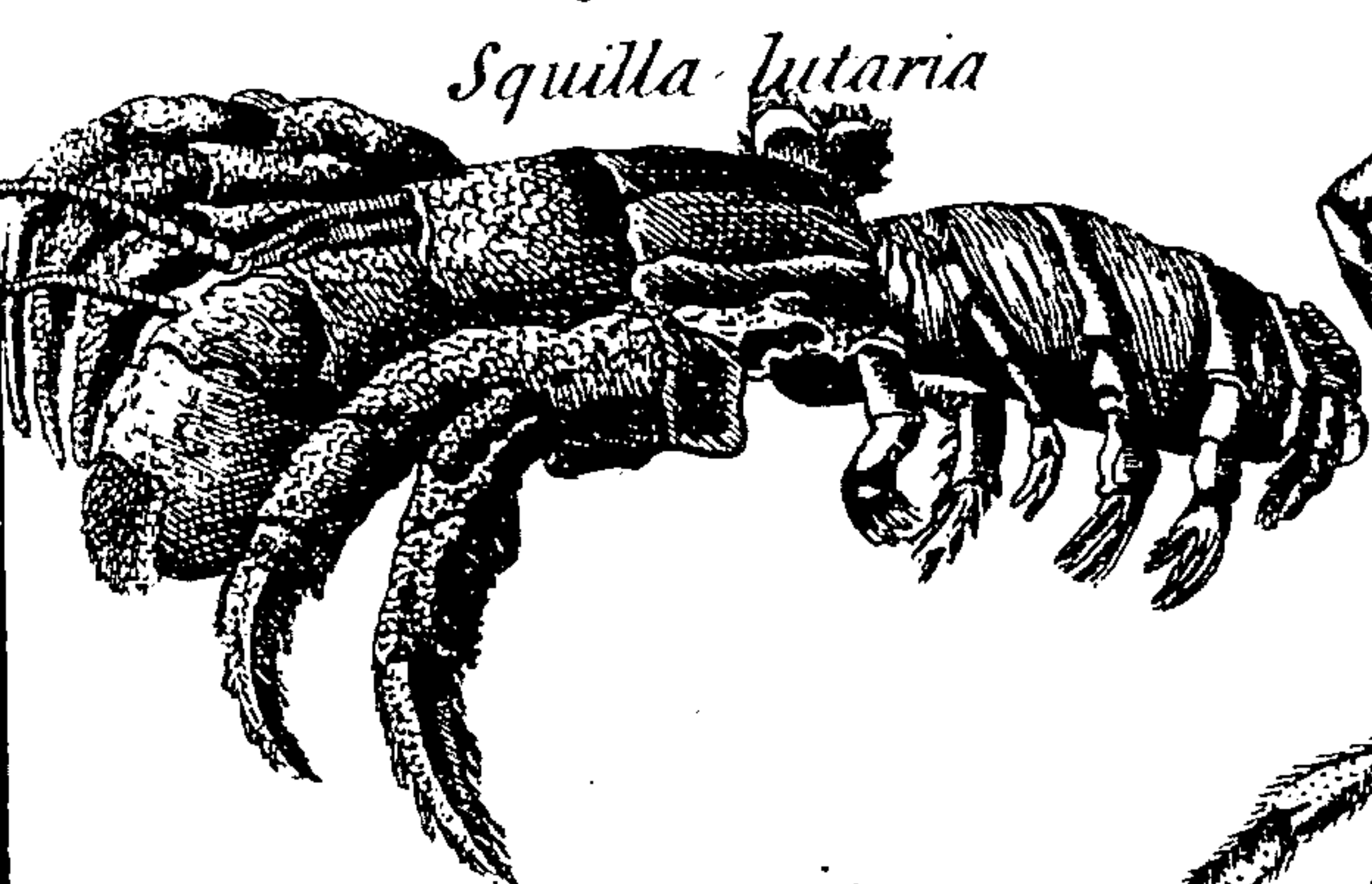
Cancer lanosus



Cancer spinosus longimanus minor.



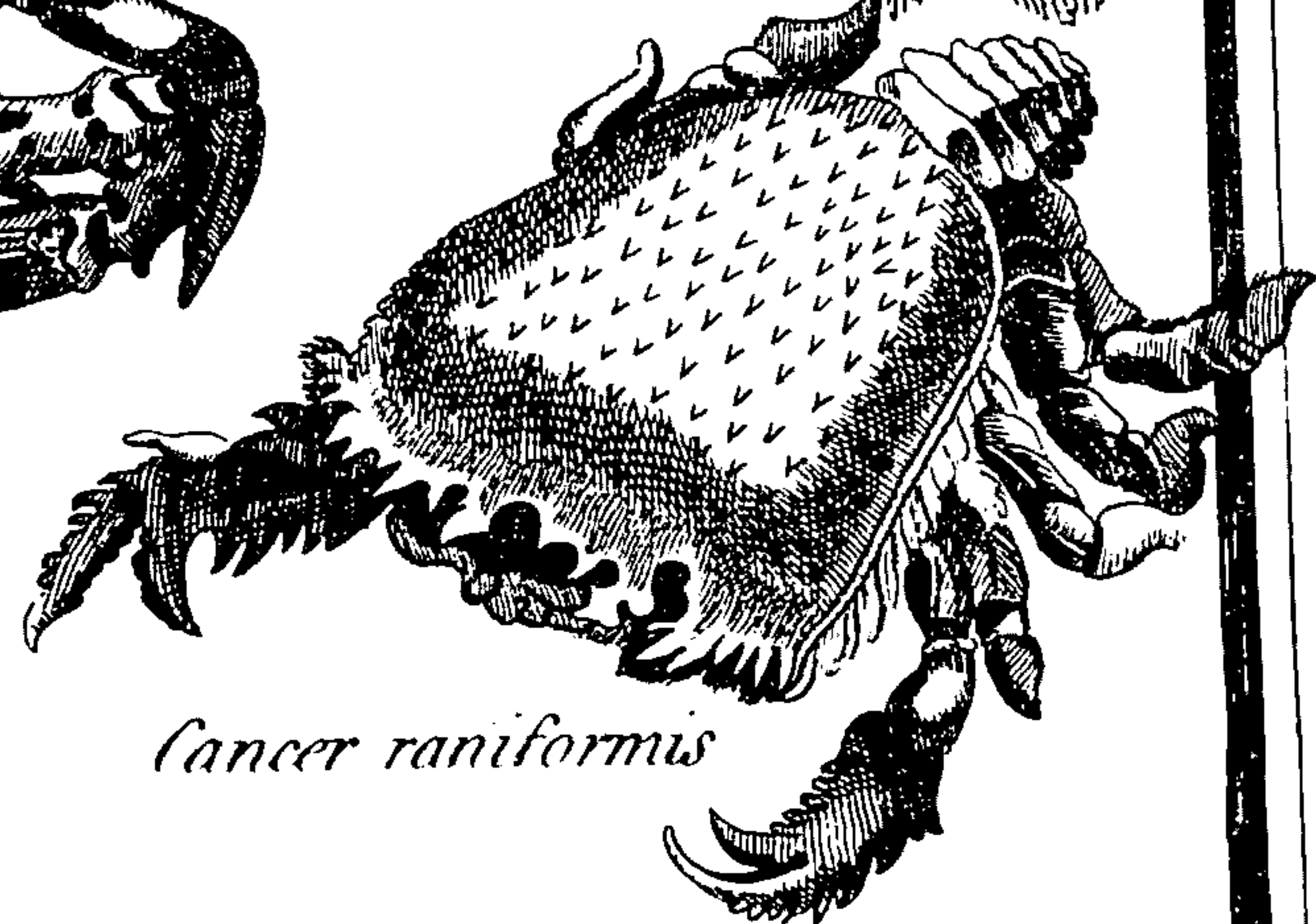
Squilla Arenaria



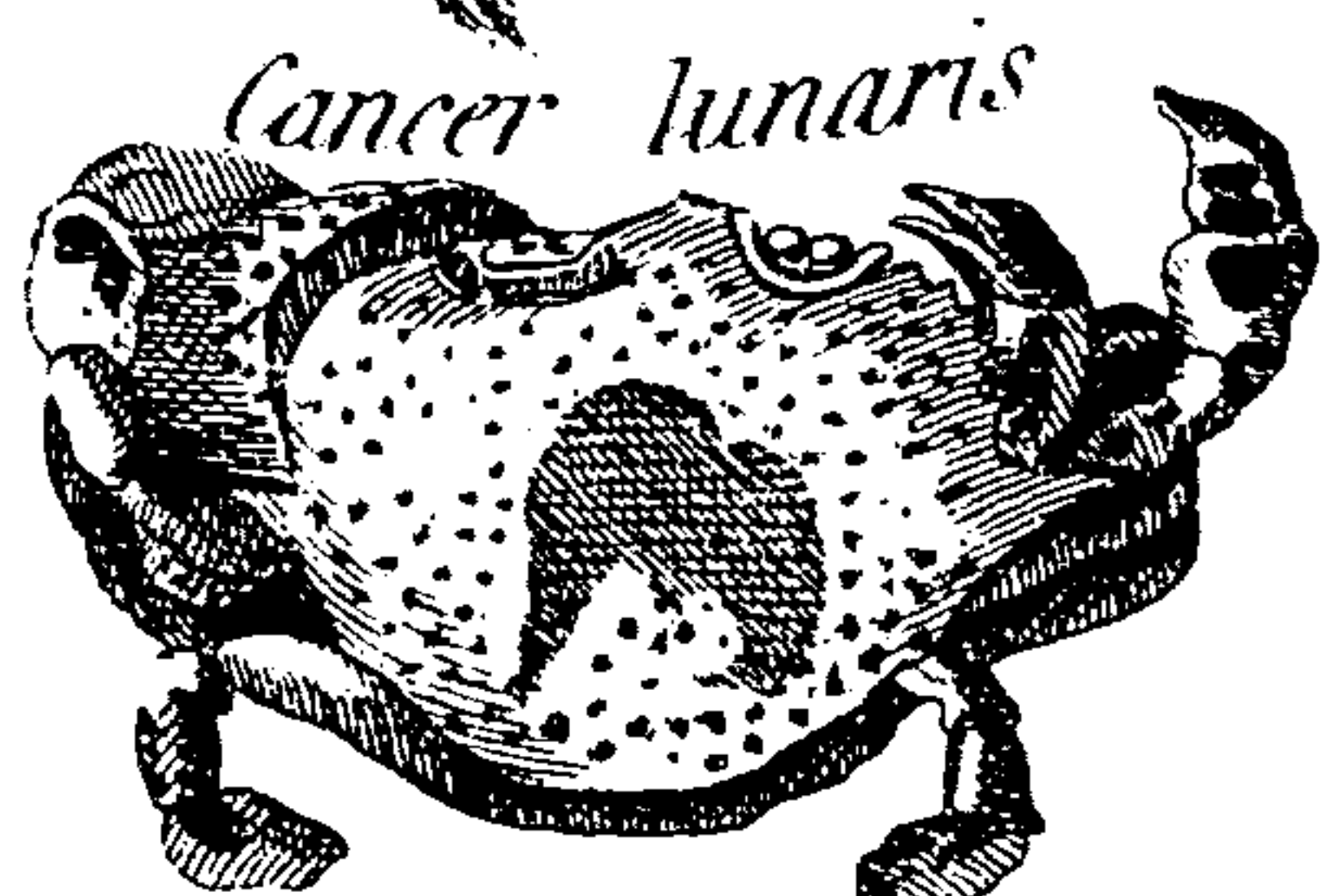
Squilla lutaria



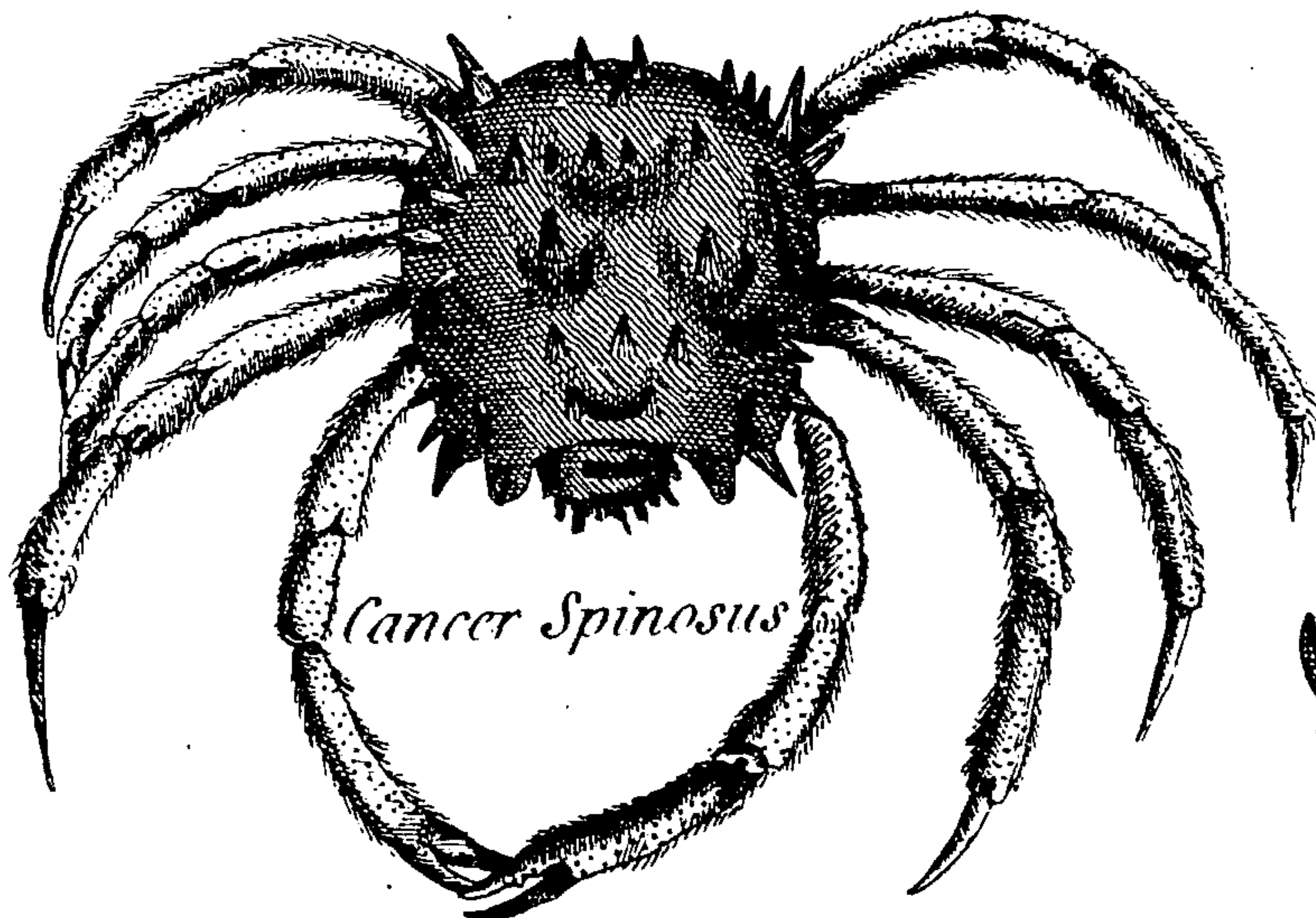
Paqurus



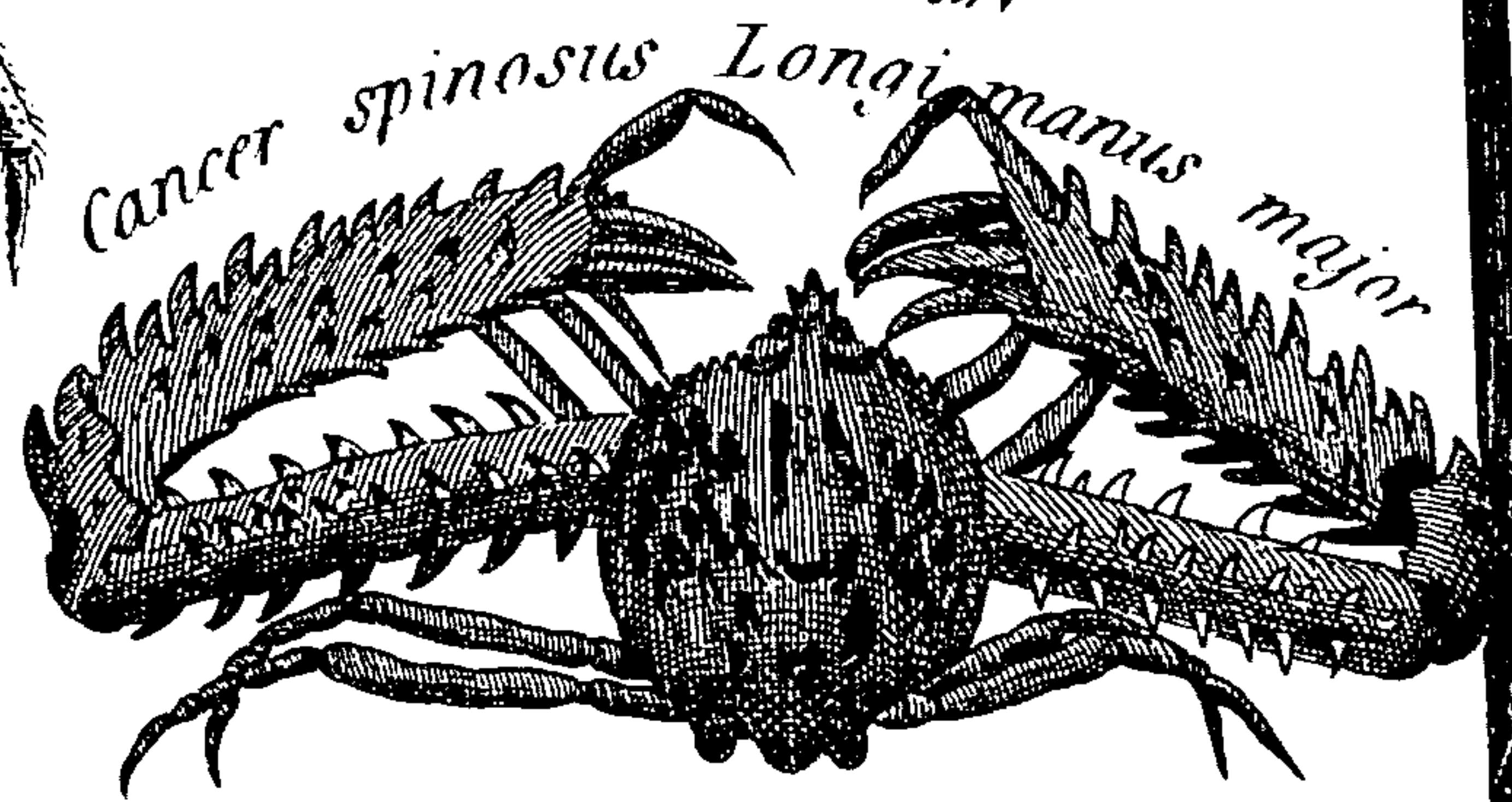
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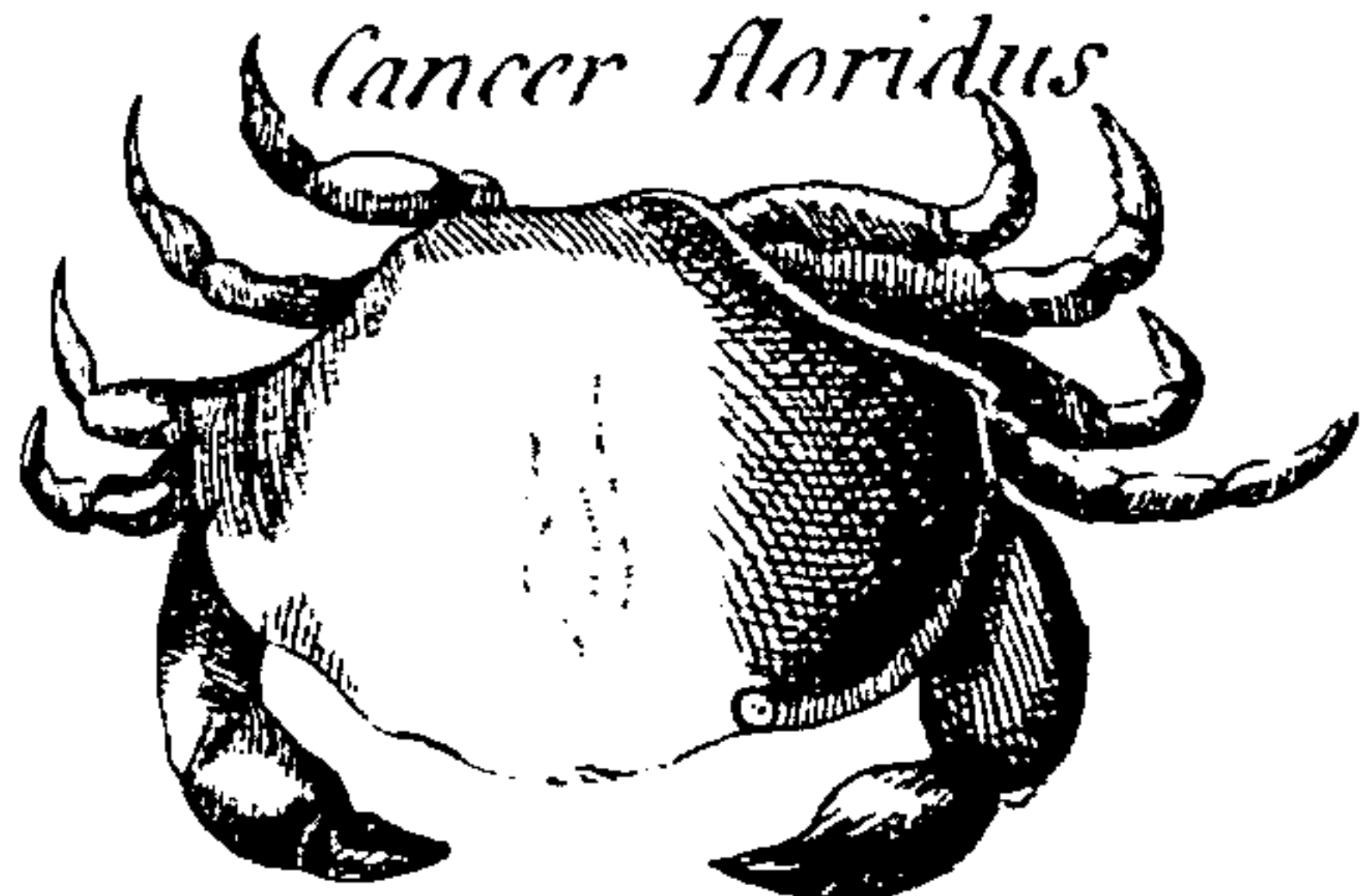
Cancer lunaris



Cancer Spinosus



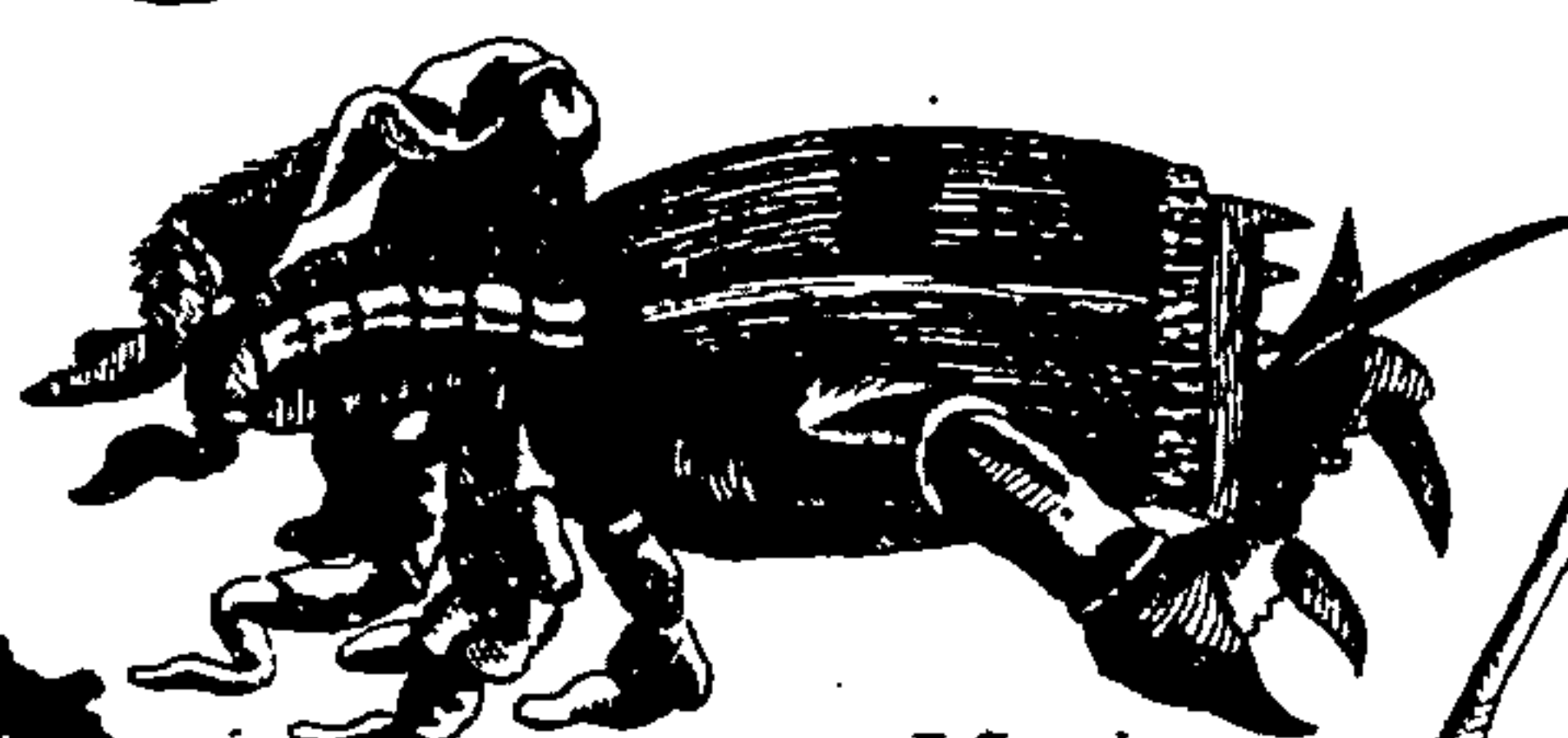
Cancer spinosus Longimanus major



Cancer floridus



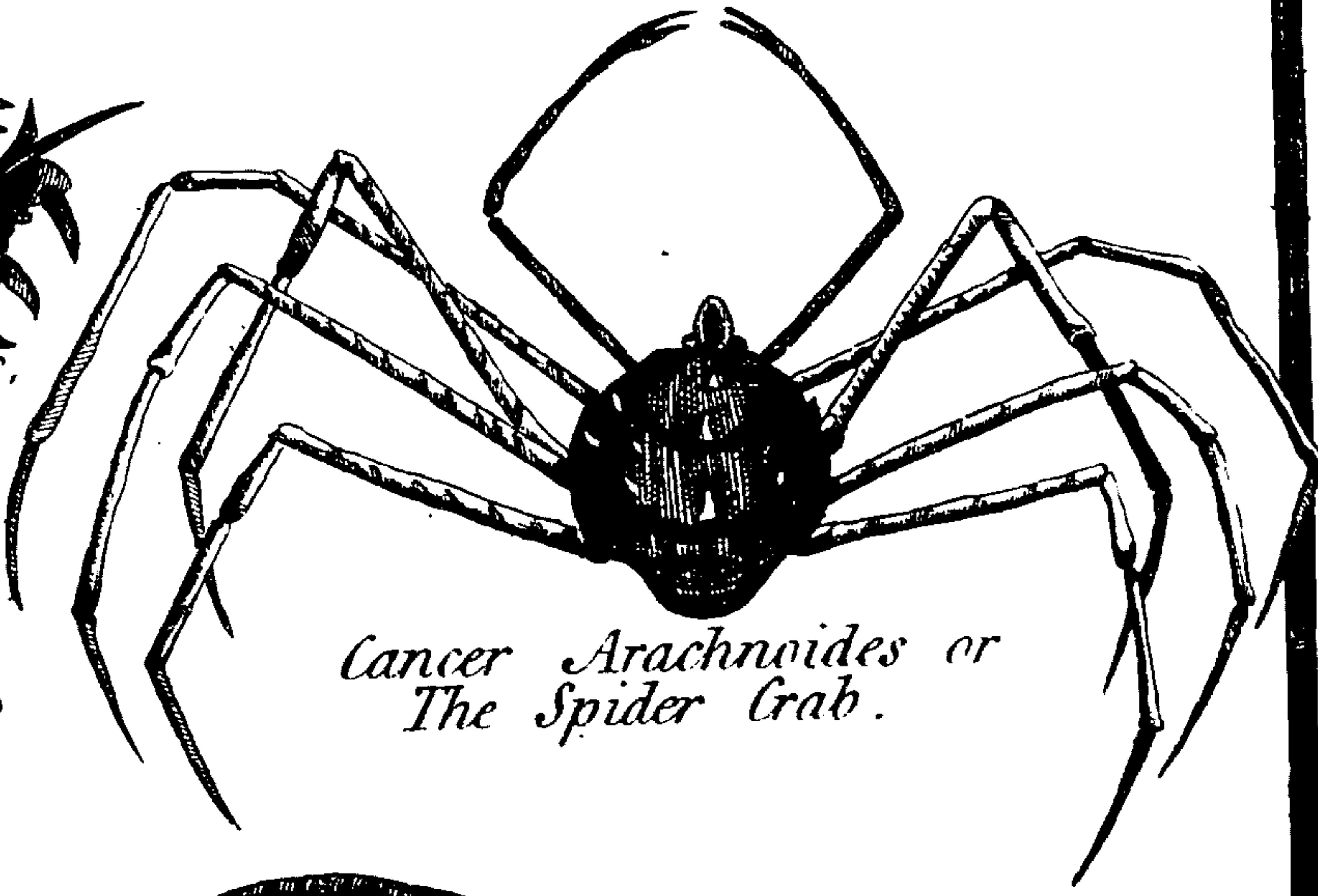
Cancer Spinosus, or the Rots-Grab



Pediculus Marinus, or The Sea Louse.



Cancellus anatum crafus



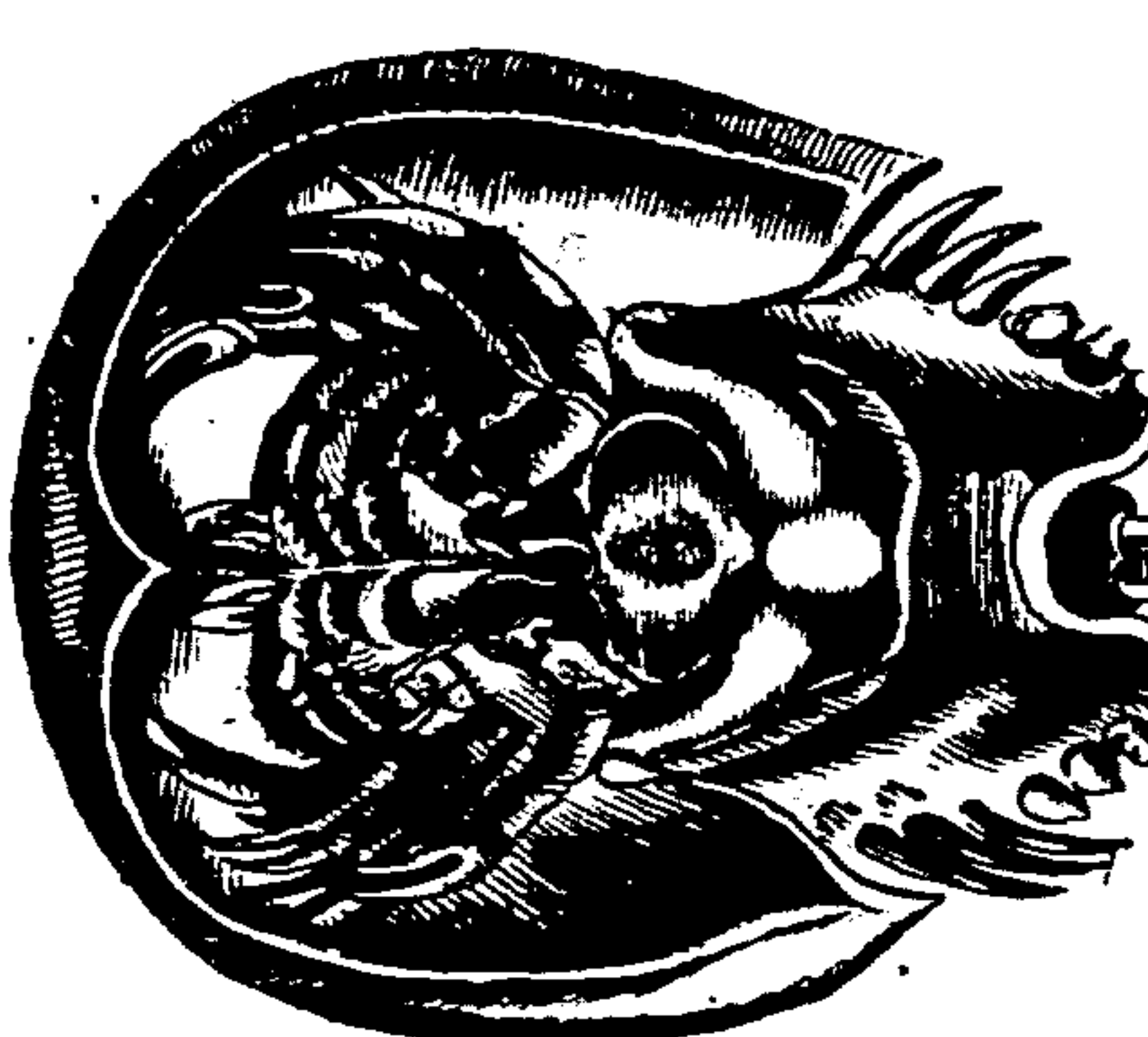
Cancer Arachnoides or The Spider Crab.



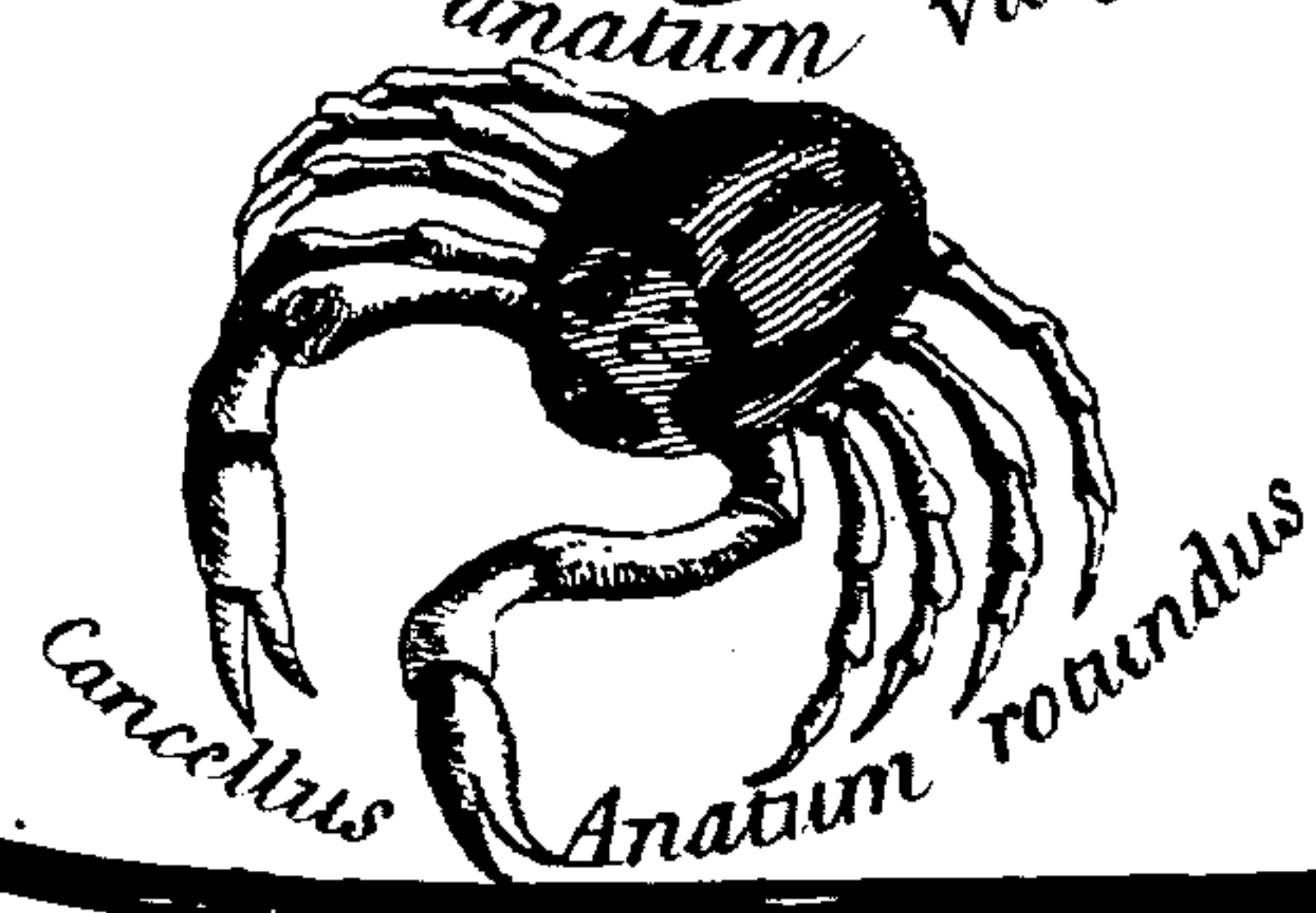
Cancellus anatum vulgaris



Cancer Calappoides



Cancer Moluccensis or The King-Grab.



Cancellus Anatum rotundus

The form of the Lobster is so very extraordinary, that the head may be almost mistaken for the tail; but it may be soon discovered, that the animal moves with its claws foremost; and that the part which plays within itself by joints, like a coat of armour, is the tail. The two great claws, which are the Lobster's instruments of provision and defence, open like a pair of nippers, and have very great power; they are usually notched like a saw, which enables it to take the firmer hold. Besides these instruments, the animal has eight legs, four on each side; which, with the assistance of the tail, give the animal its progressive and sideling motion. The head, which is very small, is between the two claws, and is furnished with eyes, which appear like two black horny specks on each side. The mouth, like that of insects, opens the long way of the body; and is furnished with two teeth for the comminution of its food: between the two teeth there is a fleshy substance in the shape of a tongue. It has also three teeth in the stomach; one on each side, and the other below. It has two long feelers, or horns, that issue on each side of the head. The tail is the grand instrument of motion; and with this it can raise itself in the water. Under this the spawn is lodged in great abundance; every pea adhering to the next by a very fine filament, which is almost imperceptible. They continue in this situation till they become furnished with limbs and motion, and then drop off into the water.

After leaving the parent, the young lobsters immediately seek for refuge in the smallest clefts of rocks, or other crevices at the bottom of the sea, where the opening is but small, and such opening can be easily defended. There they grow larger in a very short time, from the mere accidental nourishment which the water washes to their retreats. In a few weeks they acquire a hard firm shell, which furnishes them with offensive and defensive armour.

The body of the Lobster continues to increase, while the shell continues of the same size; the animal thus becomes too large for its habitation, and is imprisoned within the crust that nature has gathered round it; and is therefore under a necessity of getting free. As the young of this kind grow faster, they change their shell oftener than the old; the latter remaining in the same shell for two or three years together. In general, however, they change their shell once a year; but for some days before it undergoes this change, it ceases to be so voracious as formerly, and lies torpid and motionless, as if in anxious expectation of the approaching alteration. Just before casting its shell, it throws itself upon its back, and the whole body is in violent motion, and at length the shell is seen beginning to divide at its junctures. It also appears turned inside out, and its stomach comes away with its shell. In a short time, however, this wonderful creature finds itself at liberty; but in so weak and enfeebled a state, that it continues motionless for several hours. After this extraordinary change, it has the softness and the timidity of a worm; every animal of the deep being then a powerful enemy, which they can neither escape or oppose. But this state of defenceless imbecility is of short duration, for in less than two days, the skin of its body is almost as hard as before; its appetite also increases; and, however extraordinary it may appear, its first repast is upon its own stomach, and afterwards it devours its former shell. In about forty-eight hours, the new shell is perfectly formed, and becomes as hard as that which it has parted with.

Thus newly equipped, the creature ventures more boldly among the animals at bottom, and, in its combats, frequently suffers some mutilation. A joint or a claw is sometimes lost in these encounters,

which nature quickly repairs; a new claw speedily springs out, which, at first, is small and tender, but in the space of three weeks becomes almost as large as the old one which is lost; but it never arrives to the full size; we often see the claws of Lobsters of unequal magnitude, which is thus accounted for.

There are many variations of this extraordinary animal. It is found above three feet in length, and if we admit the shrimp and the prawn in the class, it is sometimes seen not above an inch. These all live in the water, and cannot long endure its absence. The shell, when taken out of the water, is black, but becomes red by boiling.

The river craw-fish differs little from the Lobster; but it will live only in the fresh water, and the other only in the sea.

NATURAL HISTORY of the CRAB.

THE Crab resembles the lobster in its habits and conformation, but differs materially in shape. It is found equally in fresh and salt water, as well upon land as in the ocean. The tail is not so apparent as in the former; being that broad flap that appears to cover a part of the belly, and, when lifted, discovers the spawn situated there in great abundance. Like the lobster, it has two claws; and, like the lobster, it has eight legs, four on each side. Like the lobster, it is also a bold voracious animal; and indeed it resembles that animal in every thing but the amazing bulk of its body, compared to the size of its head, and the length of its intestines, which have many convolutions.

The VIOLET CRAB.

The Violet Crab of the Caribbe Islands is truly remarkable for its shape, the delicacy of its flesh, and the singularity of its manners. It resembles two hands cut through the middle, and joined together; for each side looks like four fingers, and the two nippers or claws resemble the thumbs. The rest of the body is covered with a shell, as large as a man's hand, and bunched in the middle; on the fore part of which there are two long transparent eyes, about the size of a grain of barley, and as hard as horn. The mouth is covered with a kind of barbs; under which there are two broad sharp teeth as white as snow. With these the animal can easily cut fruits, leaves, and rotten wood, which is their usual food.

The shell is full of a thick, fat, fibrous liquor, which is used by the inhabitants in fauces. In the middle of this is the stomach; and under the body there is a kind of breast-plate, composed of several pieces set together; and beneath that, on each side, there are five or six barbs.

These animals are, in general, of a violet colour, though some are variegated with white, blue, and violet: but the surprizing part of this creature's history is to follow; and what we are going to relate, were it not as confidently confirmed as any other circumstance in natural history, might well stagger our belief. They not only live in a kind of orderly society in their retreats in the mountains, but in the months of April or May, they march down to the sea-side in a body of some millions at a time: they fall out by thousands from the stumps of hollow trees, from the clefts of rocks, and from the holes which they dig for themselves under the surface of the earth. The ground is then covered with this band of adventurers, insomuch that it is almost impossible to set down one's foot without treading upon them. The procession sets forward from the mountains with as much regularity, as an army under the guidance of an experienced general; and are usually divided into three battalions, or companies;

nies; the first of which consists of the largest and strongest males, that, like pioneers, march forward to clear the route, and face the greatest dangers. These are often obliged to halt for want of rain, and go into the most convenient encampment till the weather changes, for they cannot long endure the intense heat of the sun. The main body of the army is composed of females, which never leave the mountains till the rain is set in for some time; and then they descend in regular battalia, being formed into columns of fifty paces in breadth, and three miles in length, and so close, that they almost cover the ground. Three or four days after this the rear guard follows; a straggling undisciplined tribe, consisting of both males and females. They march chiefly in the night, but if it rains in the day, they do not fail to profit by the occasion; and they continue to move forward in their slow uniform manner. When the sun shines, they get to the sides of woods to avoid the heat, waiting till the cool of the evening. When they are terrified, they march back in a confused disorderly manner, holding up their nippers, with which they sometimes tear off a piece of the skin, and then leave the weapon where they inflicted the wound: they even try to intimidate their enemies, by clattering their nippers together. They are however possessed of one very unsocial property, for if any one of them becomes accidentally maimed, so as to be incapable of proceeding, the rest fall upon him, and devour him on the spot.

In dry seasons, they are sometimes three months in marching down to the sea-side; but, in heavy rains, they often reach it in eight or ten days.

When they have arrived at their destined port, they prepare to cast their spawn. The Crab has no sooner reached the shore, than it hastens eagerly to the edge of the water, and suffers the waves that beat upon the shore to flow over its body two or three times. This seems only a preparation for bringing their spawn to maturity; for, without farther delay, they withdraw to seek a lodging upon land. In the mean time the spawn grows larger, is excluded out of the body, and adheres to the barbs under the breast-plate. This bunch is seen as large as a hen's egg, and exactly resembling the roes of herrings. In this state of pregnancy, they again seek the shore for the last time, and shaking off their spawn into the water, leave chance to bring it to maturity. Immense shoals of hungry fish are at the shore, in expectation of this annual supply; and about two-thirds of the Crabs eggs are immediately devoured by these rapacious invaders. The eggs which escape are hatched under the sand; and soon after millions at a time of these little Crabs are seen quitting the shore, and slowly travelling up the mountains.

The old ones, however, are not so active to return; they become so lean and feeble that they can hardly creep along, and the flesh at that time changes its colour; therefore most of them are obliged to stay in the flat parts till they recover, making holes in the earth, which they cover at the mouth with leaves and dirt, so that no air may enter. There they throw off their old shells, which they leave in a manner quite whole; the place where they opened on the belly being unseen. After this they are quite naked, and almost without motion, for five or six days together, when they become so fat as to be delicious food. They have then four large white stones under their stomachs, which gradually decrease in proportion as the shell hardens, and, when they come to perfection, entirely disappear. At that time the animal is seen slowly making its way back to its retreats in the mountains.

The SOLDIER CRAB.

The Soldier Crab has some similitude to the lobster, if divested of its shell. It is usually about four inches long, has no shell behind, but is covered down to the tail with a rough skin, terminating in a point. Like the lobster, however, it is armed with strong hard nippers before; one of which is as thick as a man's thumb, and pinches most powerfully. But though nature has refused a shell to any part of this animal except its nippers, the Soldier Crab has recourse to art for a supply: it takes possession of the deserted shell of some other animal, in which it resides, till by growing too large for its habitation, it is under a necessity of change. They descend every year to the sea-side to deposit their spawn and provide themselves with a new shell; and when they find one proportionable to their bulk, they get into it, and march along as if they were clothed in armour; from whence they have the name of Soldiers. They march up to the tops of mountains, and take their lodgings in hollow trees, where they live upon leaves, fruits, and rotten wood. The next year, when the body begins to grow too large for the shell, they travel down to the sea-side again, in search of others that fit them better. After examining several, and finding out one of a proper size, they immediately quit their old habitation, and occupy the new one.

Besides these, there are the white Crab of the Caribbe Islands; the sea Crab; the square Crab; the South-American Crab; the Indian Land Crab, &c. but they have all one property, which is very wonderful. When their nippers are laid hold of, they can easily part with them to make their escape; besides, if one of them should happen to be wounded, the animal immediately parts with it, and by that means gets rid of the wound and the limb together; well knowing that nature will soon furnish it with another.

NATURAL HISTORY of the TORTOISE.

TORTOISES are usually divided into those that live upon land, and those that subsist in the water; and use has made a distinction even in the name; the one being called Tortoises, the other turtles. Seba has proved, however, that all Tortoises are amphibious; that the land Tortoise will live in the water, and that the sea turtle can be fed upon land. The land Tortoise is generally found from one foot to five feet long, from the end of the snout to the end of the tail; and from five to eighteen inches across the back. It has a small head, somewhat resembling that of a serpent; an eye without the upper-lid; the under eye-lid serving to cover and keep that organ in safety. It has a long scaly tail, like that of the lizard. It can put out or conceal its head at pleasure, under the great pent-house of its shell; where it can remain secure from all attacks.

Though peaceable in itself, the Tortoise is admirably formed for war, and seems almost endued with immortality. Nothing can kill it; the depriving it of part of its body, is but a slight injury; it will live, though deprived of the brain; it will live though deprived of the head. Redi informs us, that he made a large opening in the head of a land Tortoise, drew out all the brain, and washed the cavity so as not to leave the smallest part remaining, and then, leaving the hole open, set the animal at liberty. Notwithstanding this, the Tortoise marched away without seeming to have received the smallest injury; and lived without a brain for six months. The Italian philosopher carried his experiment

experiment still farther; for he cut off the head, and the animal lived twenty-three days after its separation from the body.

Tortoises are also remarkable for their longevity: they are commonly known to live upwards of eighty years. There was one kept in the garden belonging to Lambeth Palace, that was remembered above an hundred and twenty.

This animal retires to some cavern to sleep for the winter; and, at that time, when its food is no longer in plenty, it happily becomes insensible to the want: it is sometimes buried two or three feet in the ground, having first providently furnished its hole with moss, grass, and other substances; as well to keep the retreat warm, as to serve for food, in case it should prematurely wake from its state of stupefaction. From this dormant state the Tortoise is awakened by the genial return of spring.

These animals are frequently taken into gardens, as they are thought to destroy insects and snails in great abundance. The strength of the Tortoise is very great; children have been seen to get upon the back of it, and it has not appeared to be overloaded, but moved off with its burthen to where it expected to be fed; but would carry them no farther.

In their external form, all Tortoises nearly resemble each other; their outward covering being composed of two great shells; one of which is laid upon the other, and they touch only at the edges: but upon a closer inspection, we shall find that the upper shell is composed of no less than thirteen pieces, which are laid flat upon the ribs, like the tiles of an house; by which the shell is kept arched and supported. Indeed, to an inattentive observer, the shells, both above and below, seem to make each but one piece; but they are bound together at the edges by very strong and hard ligaments.

NATURAL HISTORY of the SEA TORTOISE, or TURTLE.

TURTLES are usually distinguished by sailors into four kinds: the trunk Turtle, the logger-head, the hawksbill, and the green Turtle.

The trunk Turtle is generally larger than the rest, and its back is higher and rounder. The flesh of this Turtle is rank and unwholesome.

The logger-head has obtained his title from the size of his head, which is much larger in proportion than that of the other kinds. The flesh of this also is rank, and very seldom eaten.

The hawksbill Turtle has a long and small mouth, somewhat resembling the bill of an hawk. Though the flesh of this Turtle is very indifferent, the shell serves for the most valuable purposes. This is the animal which supplies the Tortoise-shell, of which snuff-boxes and a variety of beautiful trinkets are made. The flesh of this also is very indifferent eating.

The green Turtle is the most celebrated, and the most valuable of all the animals of the Tortoise kind. The delicacy of its flesh, and its nutritive qualities, together with the property of being easily digested, are now well known among us. Dampier appears to be the first who informed us of the distinctions among these animals; and that, while the rest might be valuable for other purposes, the green Turtle alone was chiefly prized for the delicacy of its flesh. The green Turtle is indeed become a branch of commerce, and ships are provided with conveniences for supplying them with water and provision, to bring them over in health from Jamaica, and other West-India Islands. This cannot, however, be always effected; for though they scarce require any provision upon the voyage, yet the

working of the ship occasions them to be beat against the sides of the boat which contains them, by which they become very lean and battered; so that, in order to eat this animal in the highest perfection, instead of bringing the Turtle to the epicure, the epicure ought to be transported to the Turtle.

The colour of the shell of this animal is rather greener than that of others of this kind; whence it has the name of the green Turtle. Those which are about two hundred weight are the most common size, though they are sometimes found to exceed five hundred. During the season, the citizens of London are remarkable for regaling themselves upon Turtle, and great numbers of these animals are dressed at the Queen's-arms-tavern, in St. Paul's church-yard, where we remember to have seen them in the two extremes: Mr. Bates exhibited at one time three Turtles, two of which together did not weigh three ounces, and the other exceeded nine hundred pounds in weight. The ancients, however, speak of much larger Turtles: Ælian assures us, that the houses in the island of Taprobane, are usually covered with a single shell; and Diodorus Siculus tells us, that a people neighbouring on Ethiopia, called the Turtle-eaters, coasted along the shore in boats made of the upper shell of this animal.

The Turtle seldom comes from the sea, but to deposit its eggs, and sometimes to sport in fresh water. In about twenty-five days after laying, the eggs are hatched by the heat of the sun; and the young Turtles, about the size of quails, are seen bursting from the sand, as if earth-born, and running directly to the sea, with instinct only for their guide. But it sometimes happens that the surges of the sea beat them back upon the shore, and they become a prey to the innumerable quantities of birds, which at that time haunt the coasts.

NATURAL HISTORY of SEA SNAILS.

THOUGH the land and Sea Snails resemble each other in many particulars, many of the latter are totally destitute of horns, and none of them have more than two. Indeed, if the horns of Snails are furnished with eyes, and if, as some imagine, the length of the horn, like the tube of a telescope, assist vision, these animals that reside in the gloomy bottom of the deep, can have no great occasion for them.

On viewing the shells of Sea-snails, we are convinced, that the animal which produces them is larger than those of the same denomination upon land. The sea appears to have the property of enlarging the magnitude of all its inhabitants. There is also a difference in the position of the mouth of the garden and Sea-snail. In the former, the mouth is placed cross-wise, as in quadrupeds; furnished with jaw-bones, lips, and teeth. In most of the Sea Snails, the mouth is placed longitudinally in the head; and, in some, obliquely, or on one side. Others of the trochus kind, are without a mouth, but are furnished with a trunk, which is very long in some kinds, and shorter in others. Those which are provided with this trunk, are, among Snails, what the tiger, the eagle, or the shark, are among beasts, birds, or fishes: the whole race of shelled animals avoid their approach; and their strongest built habitations yield to the superior force of these invaders. Though their own shells are thick and clumsy, yet their motion at the bottom is swifter than that of most other shell fish, and they seize their prey with greater facility. They boldly venture to attack even the largest shells, and with their piercing trunk bore it through in a very short time, and destroy its inhabitant.

But, of all Sea Snails, that which is most frequently seen swimming on the surface, is the nautilus; of which there are several species, which may be all divided into two. The one inhabits a small white shell as thin as paper, which it is often seen to quit and resume again; the other has a thicker shell, of the colour of mother of pearl, and but seldom quits it. This shell externally resembles that of a large snail; but is generally six or eight inches across: within it is divided into forty partitions, that communicate with each other by doors, if they may be so called. But the peculiarity for which the nautilus has been the most distinguished, is its spreading the thin oar, and catching the flying gale, to use the poet's description of it. These animals, especially those of the light kind, are chiefly found in the Mediterranean. In a calm sea, they are observed floating on the surface; some spreading their little sail; some rowing with their feet, as if they were engaged in business of the utmost consequence; and others floating upon their mouths, like a ship with the keel upwards.

The nautilus has eight feet, which issue near the mouth, and may as properly be called barbs: these are connected to each other by a skin, resembling that between the toes of the duck; but thinner and more transparent; six of these feet are shorter than the rest, and are held up as sails to catch the wind in sailing: the two others, which are longer, are kept in the water, serving like paddles, to steer their course by. When the weather is calm, it is seen expanding only a part of its sail, and rowing with the rest.

Sea Snails of every species appear to be a much more active animated tribe, than from their figure we should be induced to imagine. Though they seem, to an inattentive spectator, as mere inert masses of soft flesh, rather loaded than covered with a shell; when more closely examined, they are found to be furnished with the organs of life and sensation in tolerable perfection; and are possessed of appetites more poignant than those of animals that seem more perfect in their formation.

NATURAL HISTORY of FISHES of the OYSTER KIND.

THE Oyster differs very little from the muscle, except in the thickness of its shell, and its greater imbecility. It is formed with organs of life and respiration; with intestines which are very voluminous, and with a liver, lungs, and heart. Like the muscle it is self-impregnated; and the shell, which the animal soon acquires, serves it for its future habitation. Like the muscle, it opens its shell to receive the influx of water; and like that animal, is strongly attached to its shell both above and below.

In many particulars, however, the Oyster differs from the muscle. The shells are not equal like those of the muscle, the one being cupped, and the other flat: it always rests upon the cupped shell; for it would lose all its water if it lay upon the flat side. The shells of the Oyster are also thicker than those of the muscle: they are indeed so strongly lined and defended, that no animal will attempt to pierce them.

The muscle is capable of erecting itself on an edge, and going forward with a slow laborious motion; but the Oyster is utterly unable to change its situation. It is wholly passive, and endeavours by all its powers to remain fixed to one spot at the bottom. Rocks, stones, sea-weeds, &c. secure it against the agitation of the waves. In the rivers of the tropical climates, Oysters are frequently seen growing even amidst the branches of the forest.

Trees on the banks of the stream often bend their branches into the water, and particularly the mangrove, which delights in a moist situation: on these the Oysters hang in clusters; and in proportion as their weight sinks the plant into the water (where it still continues growing), the Oysters increase in number, and hang upon the branches. These animals will adhere to any thing; and are often found sticking to each other. This is effected by means of a kind of glue, which, when it cements, the joining is as hard as the shell, and is as difficult to be broken. Sometimes, indeed, the Oyster grows to the rocks, somewhat like the muscle, by threads; but these only take root in the shell, and do not spring from the body of the fish itself, as in the muscle.

Oysters usually cast their spawn in May: in the space of two or three days, the young are covered with a shell; and in three years the fish is large enough to be brought to market. As they continue in the places where they are deposited, and as they seem to have no other food than the afflux of seawater; it is the custom at Colchester, and other places, where the tide settles in marshes on land, to pick up large quantities of young Oysters along the shore, which hardly exceed the size of a six-pence. These are placed in beds where the tide comes in, where they remain for the space of two or three years; and are then of a proper size to be taken for sale. Oysters are said to be better tasted for being thus sheltered from the agitations of the deep: and the fresh water, which mixes with the salt in these repositories, is said to increase their growth in fatness, and to improve their flavour.

But these Oysters are much smaller than those which are found sticking to rocks at the bottom of the sea, usually called rock Oysters: these are sometimes found five or six inches in diameter, and are esteemed excellent food; but even these are very diminutive, compared to the Oysters of the East Indies, some of which are upwards of two feet over: those found along the coast of Coromandel, are capable of furnishing a plentiful meal to eight or ten people; but they are much inferior to ours, both in delicacy and flavour.

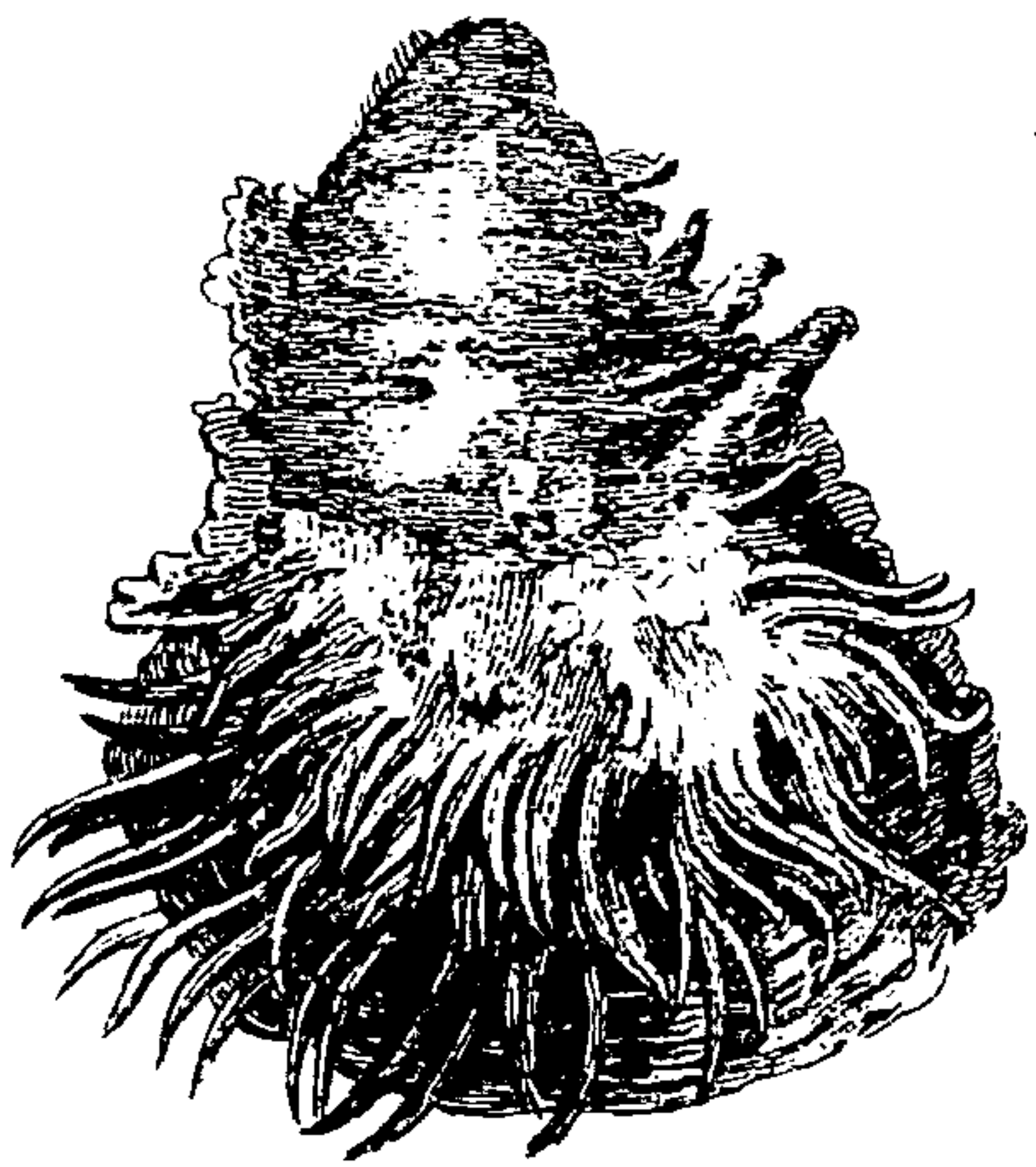
Other bivalved shell fish, such as the cockle, the scallop, and the razor-shell, have very minute distinctions. The scallop is principally remarkable for its method of moving forward upon land, or swimming upon the surface of the water. When it is deserted by the tide, it makes very extraordinary efforts to regain the water, moving towards the sea in a most singular manner. When in the water, it is capable of raising itself to the surface, supporting itself there, and even of making its way with some degree of celerity.

The pivot, or razor-shell, which has the latter name from its resembling the haft of a razor, has all its motions confined to sinking or raising a foot downwards or upwards in the sand; for it never quits the spot where it was first planted. It is frequently seen to rise about half-way out of its hole, but as soon as it is disturbed, it sinks perpendicularly down again.

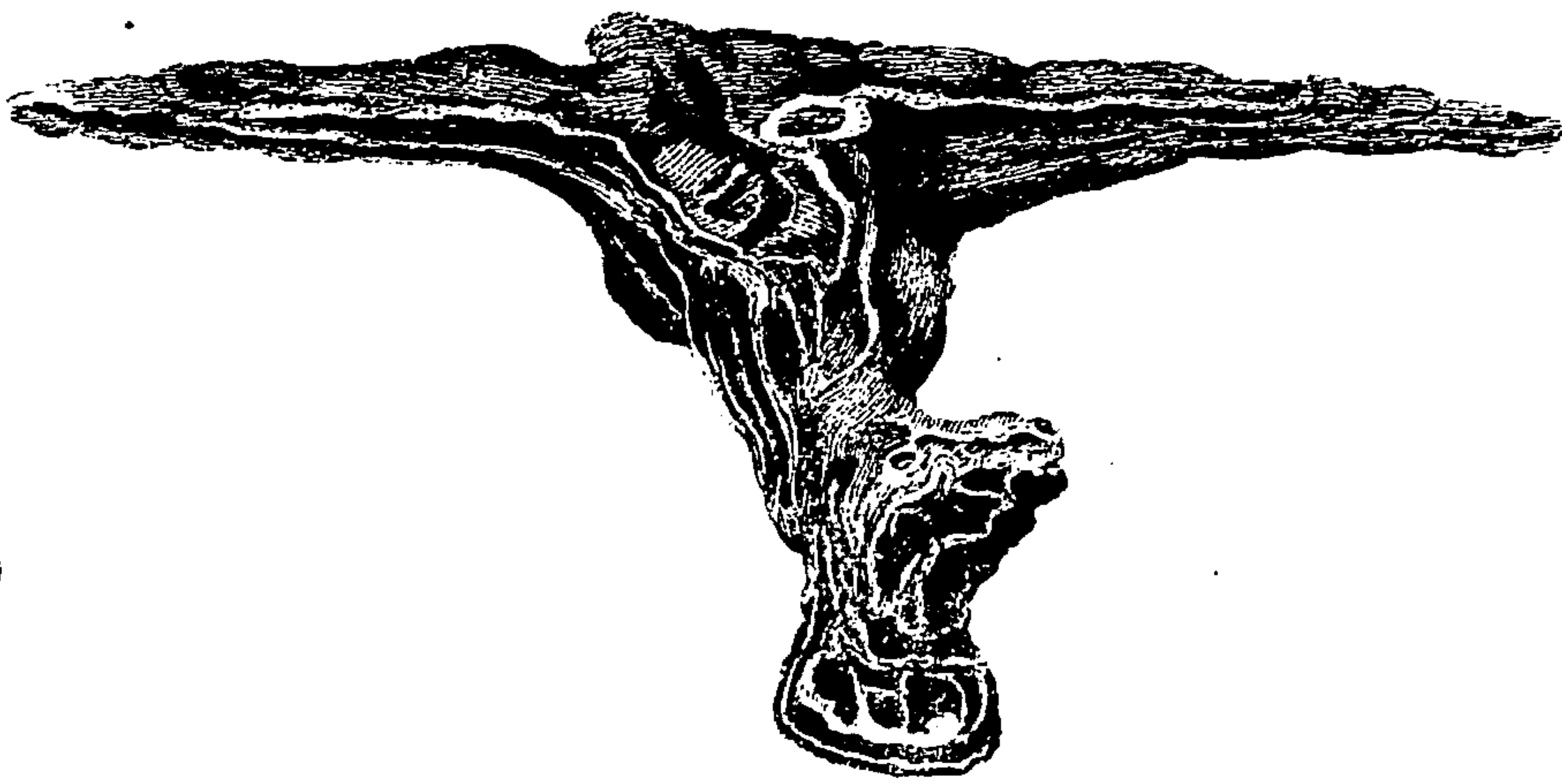
It is in this class of shell fish that pearls are found in greatest abundance; and it is in the internal parts of these shells that are of a shining silvery colour, that these gems are usually generated; but the pearl is also found in the muscle or the scallop, as well as in the Oyster: but that which particularly obtains the name of the pearl Oyster, has a large strong whitish shell, wrinkled and rough without, and within smooth, and of a silver colour. From these the mother-of-pearl is taken; which is nothing more than the internal coats of the shell, resembling the pearl in colour and consistence.

The roundest pearls, and those of the best colour, are

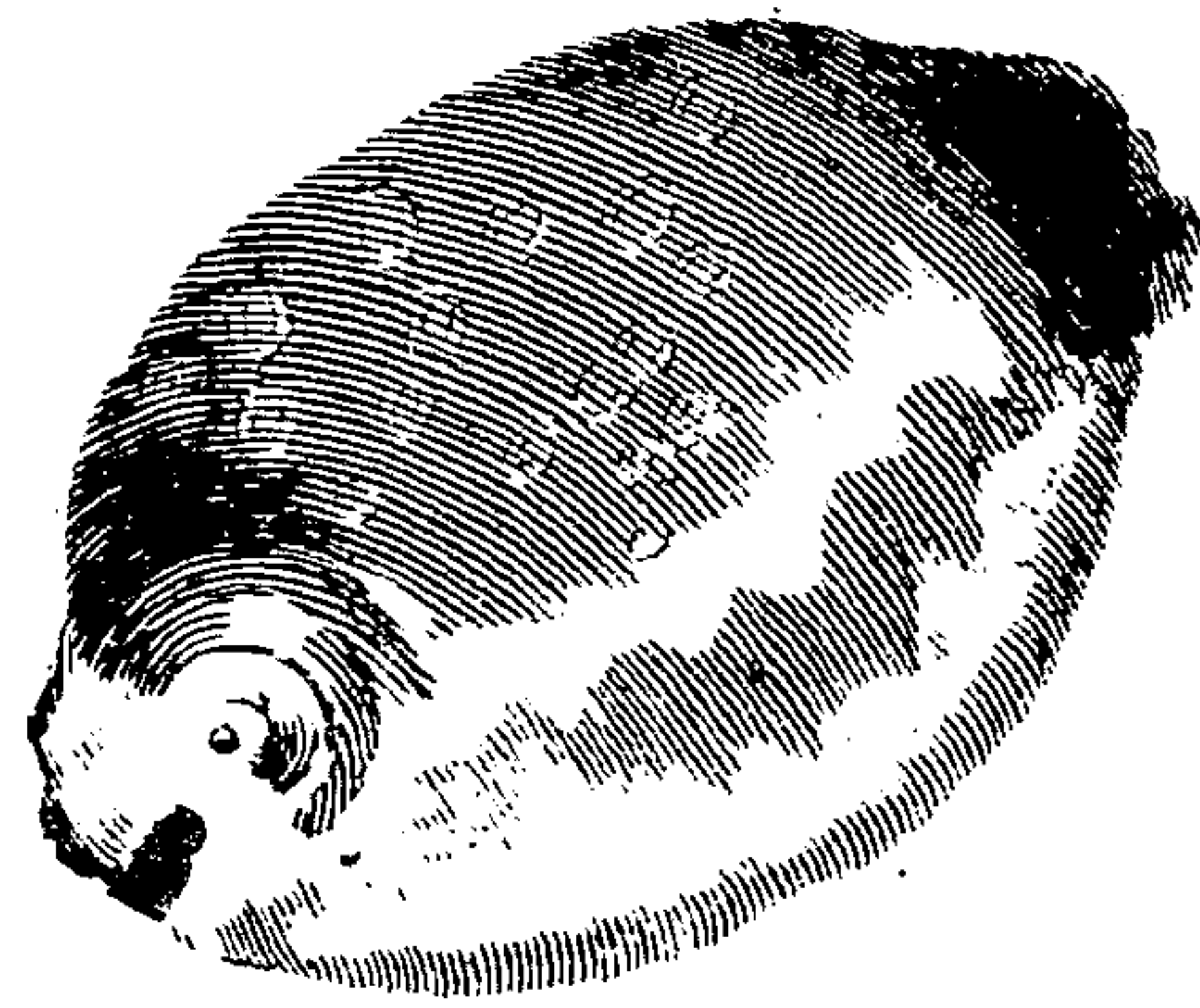
SHELL - FISH.



The Conic prickly Oyster



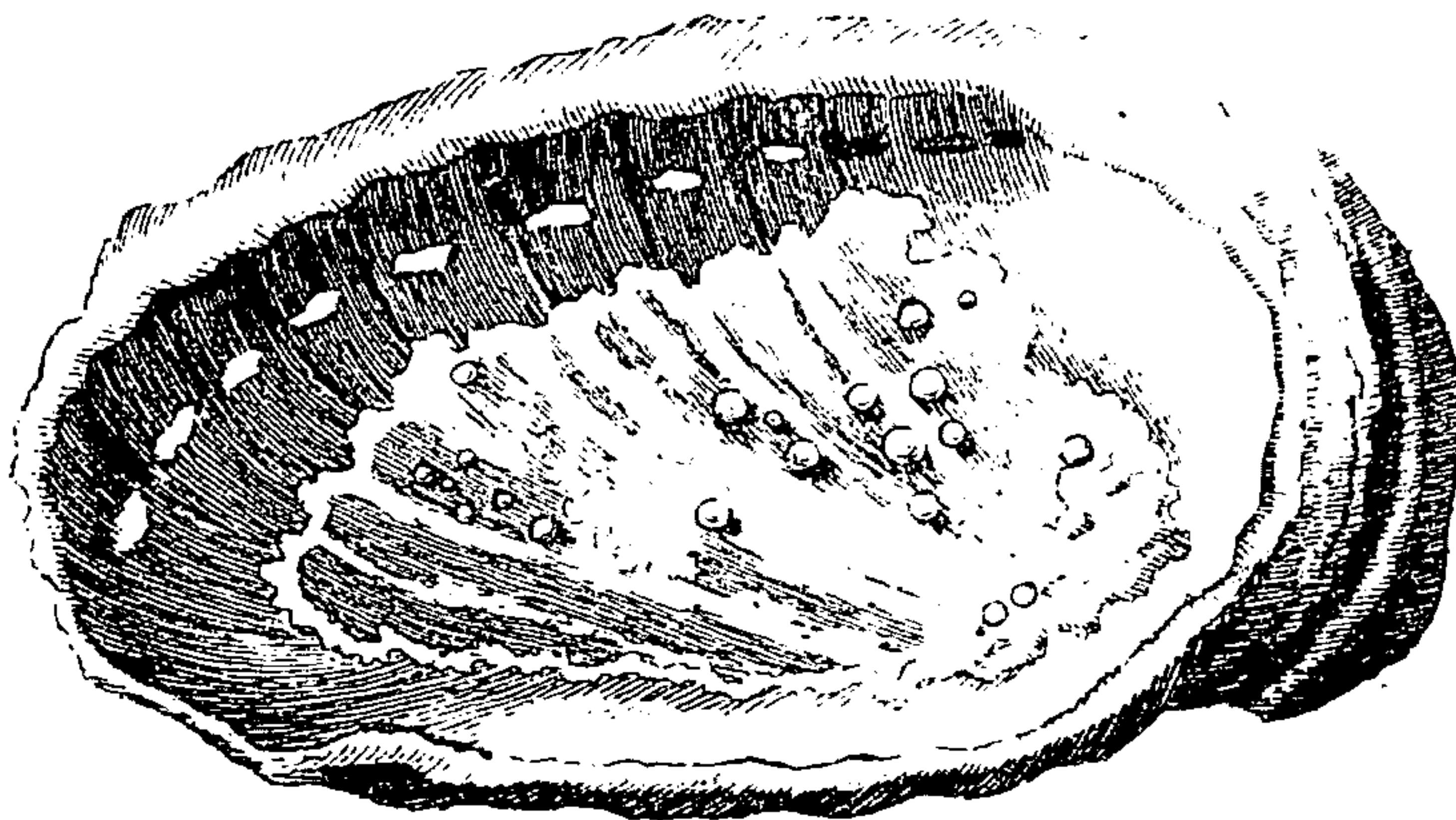
The Hammer Oyster



The Map Shell



*The White mouth'd
Yellow Dolium*



The great Ear Shell



The Olive Shell



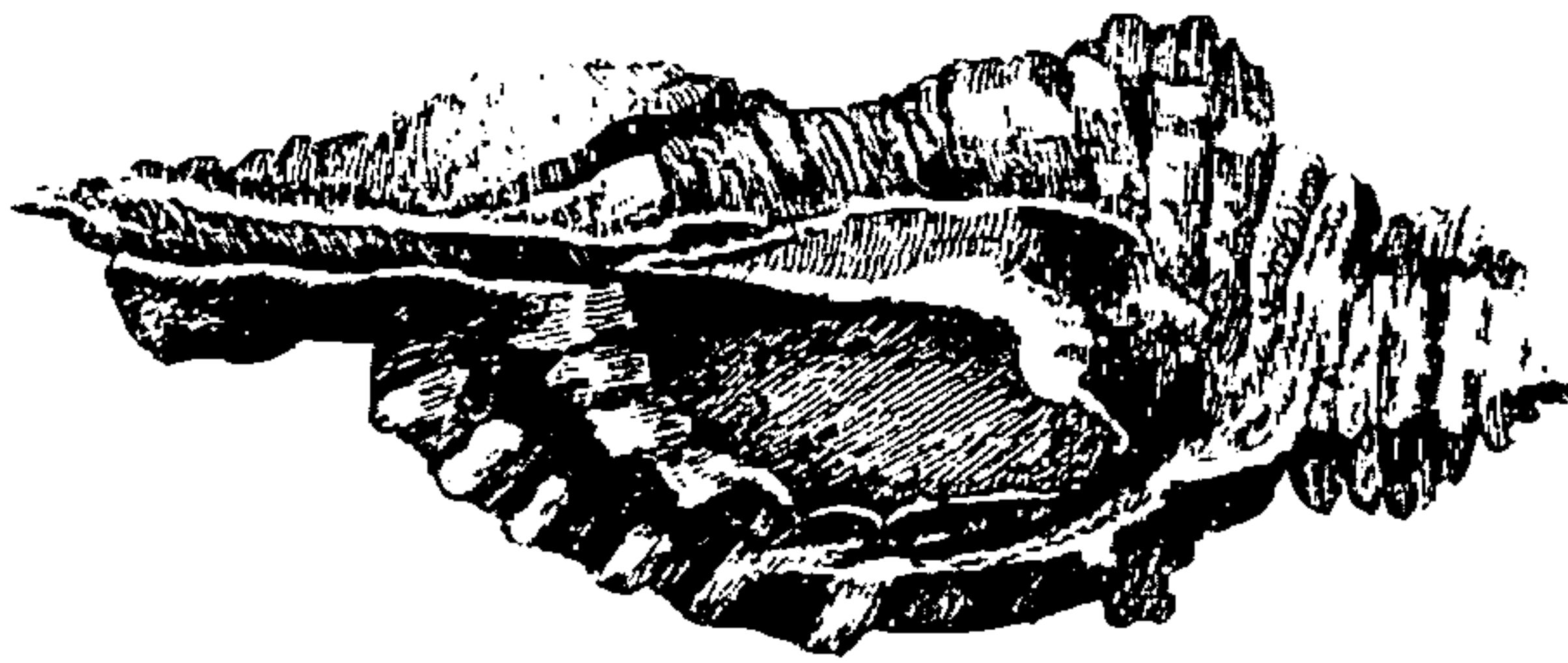
*The Zizzag
Chama*



*The Golden-
mouth'd Snail*



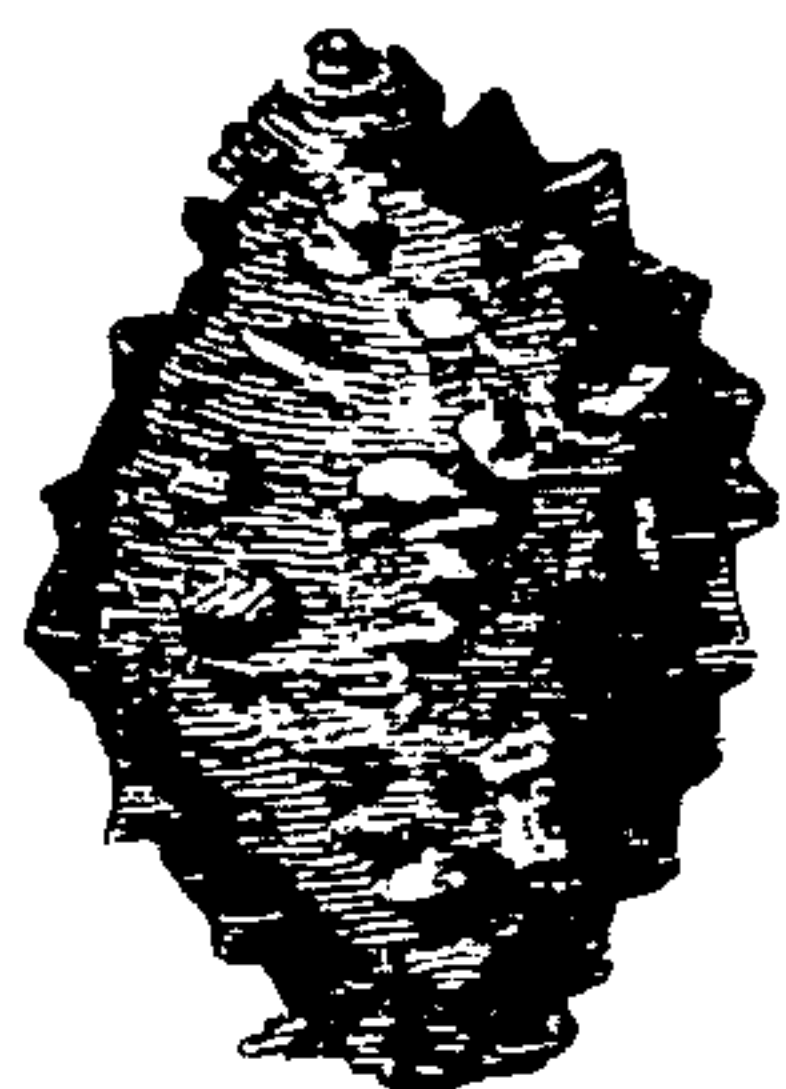
The Tyger Shell



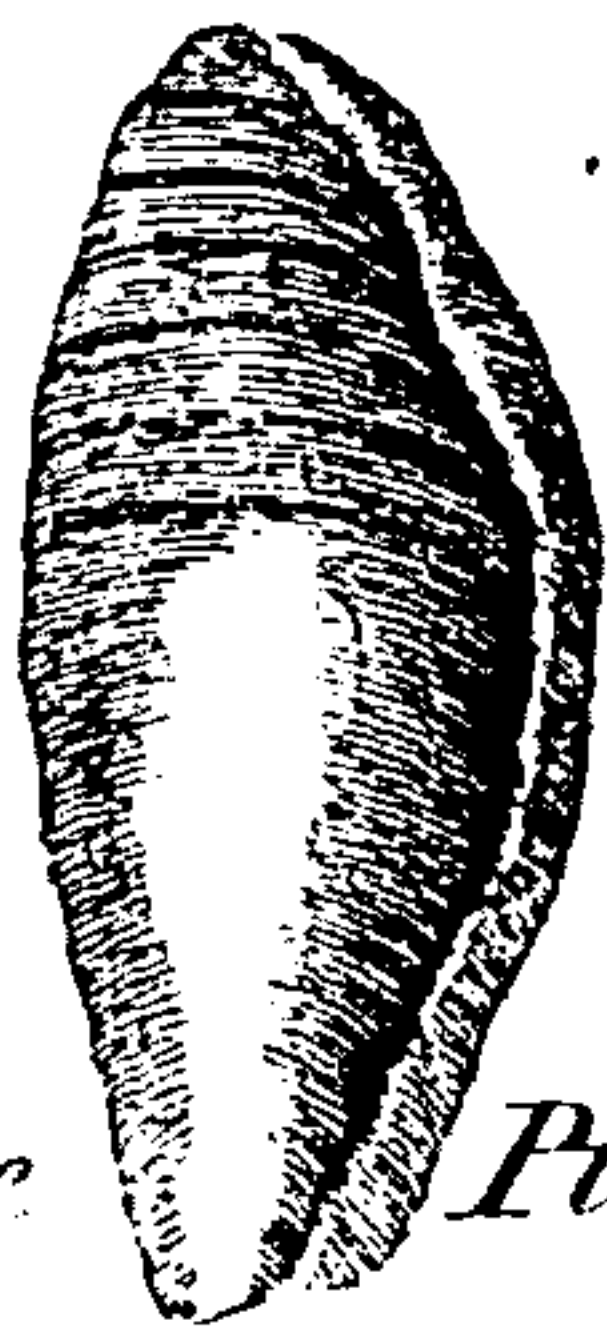
The Rough-mouth'd Buccinum



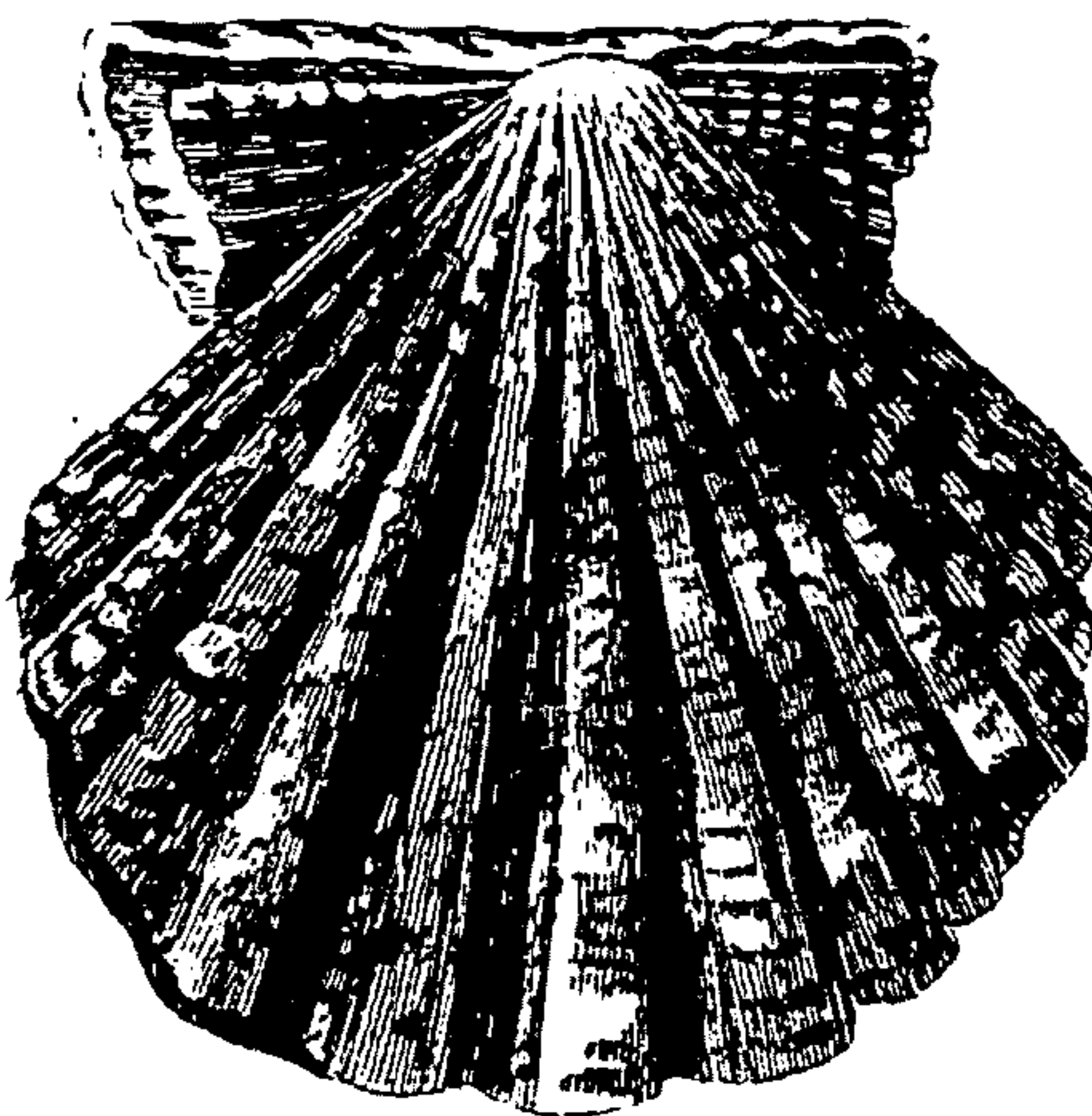
*The toothed
Nerite Snail*



The Mulberry Shell



*The Purple
Magellanick Muscle*



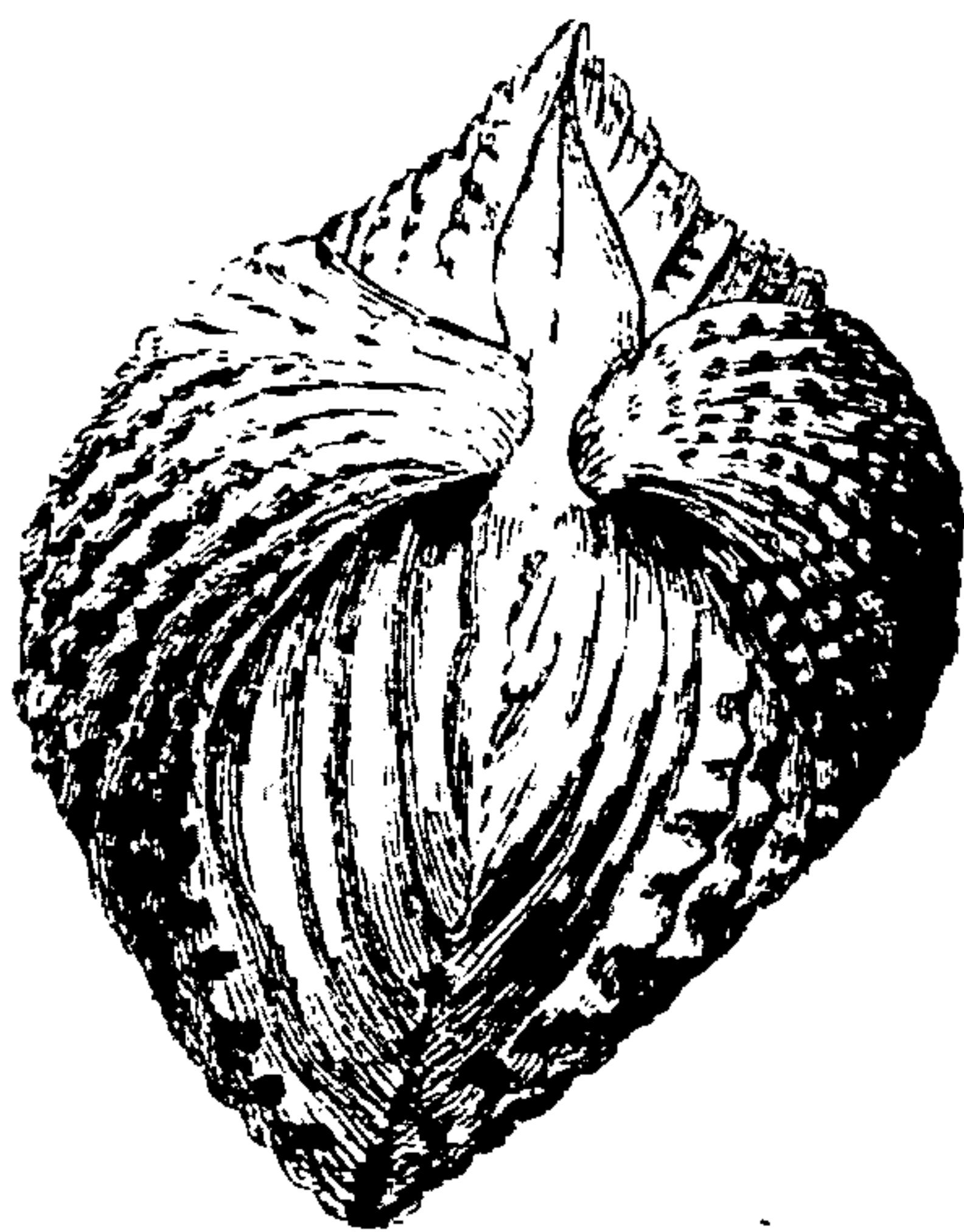
The Ducal Mantle Scallop



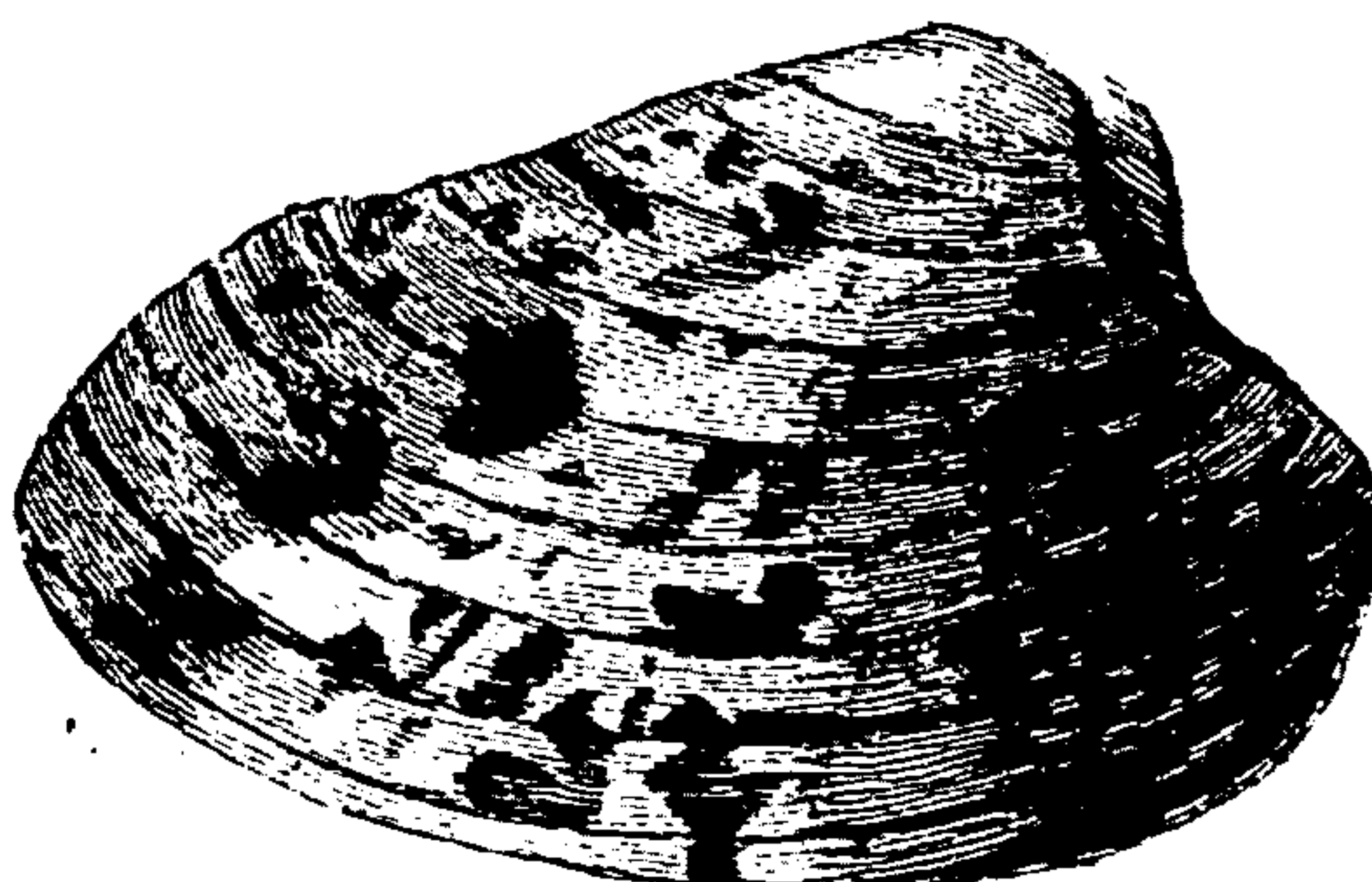
The Mitre Shell



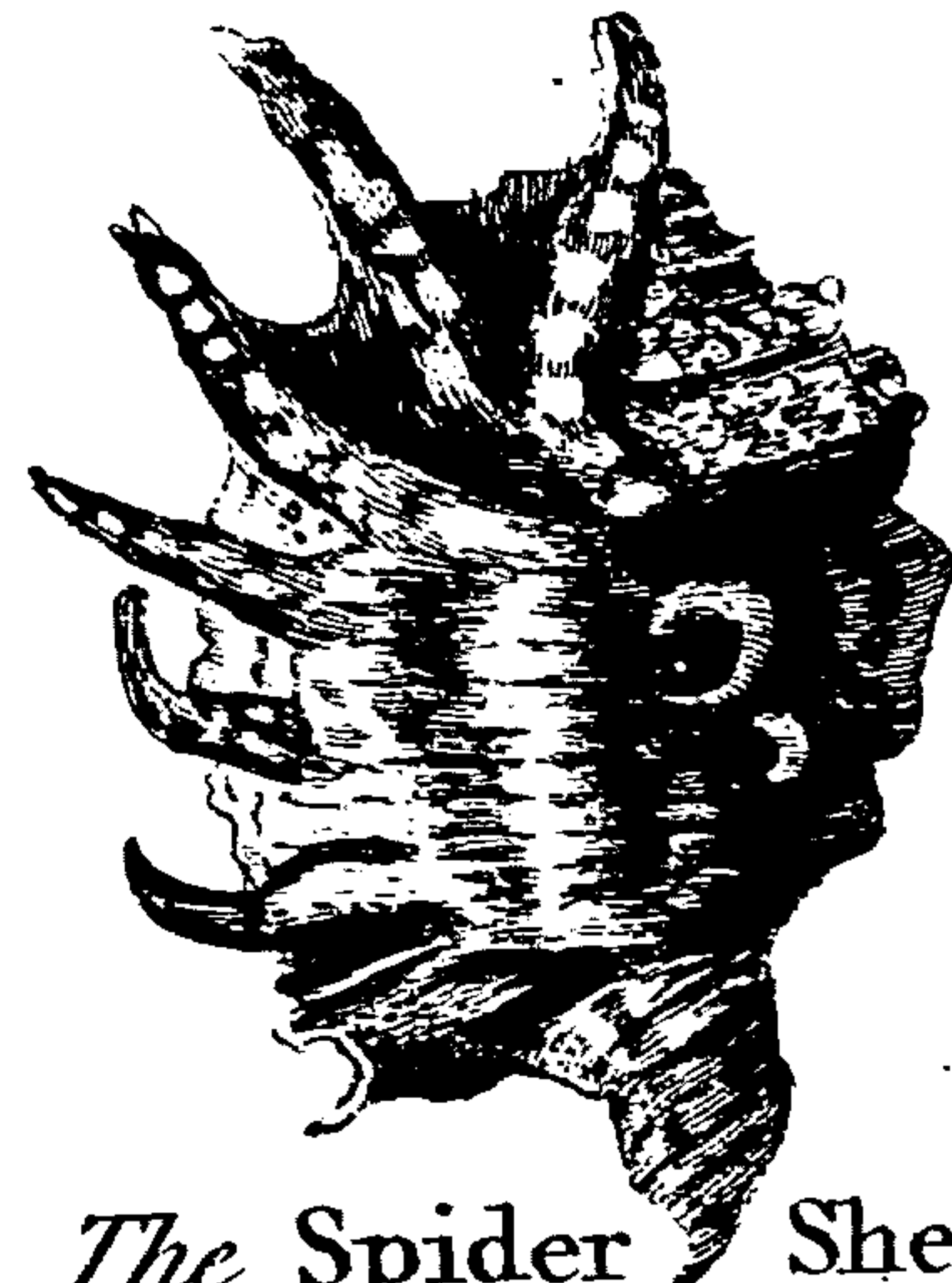
*The Old Woman Shell
or wrinkled Chama*



The Noah's Ark Heart Shell



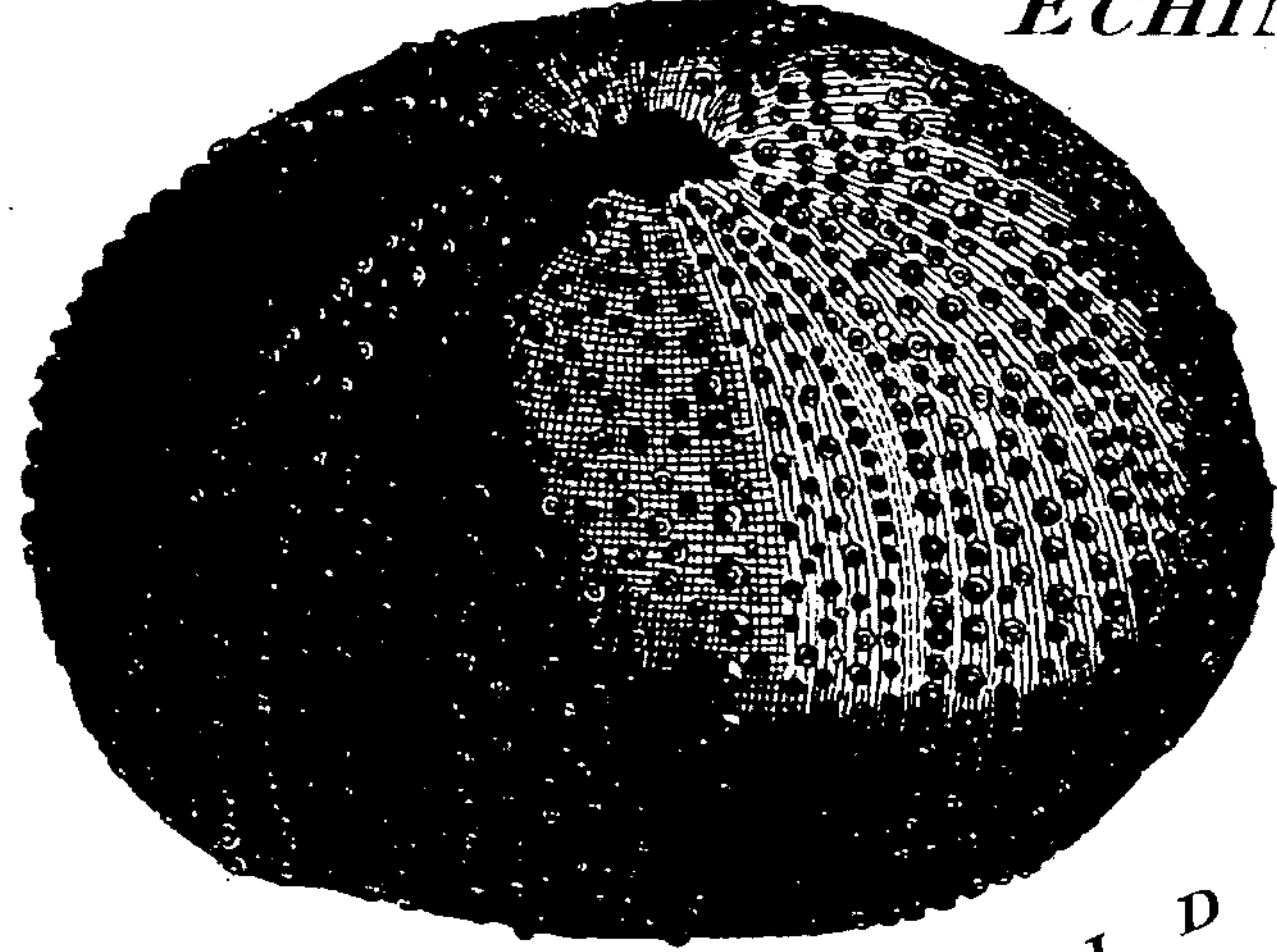
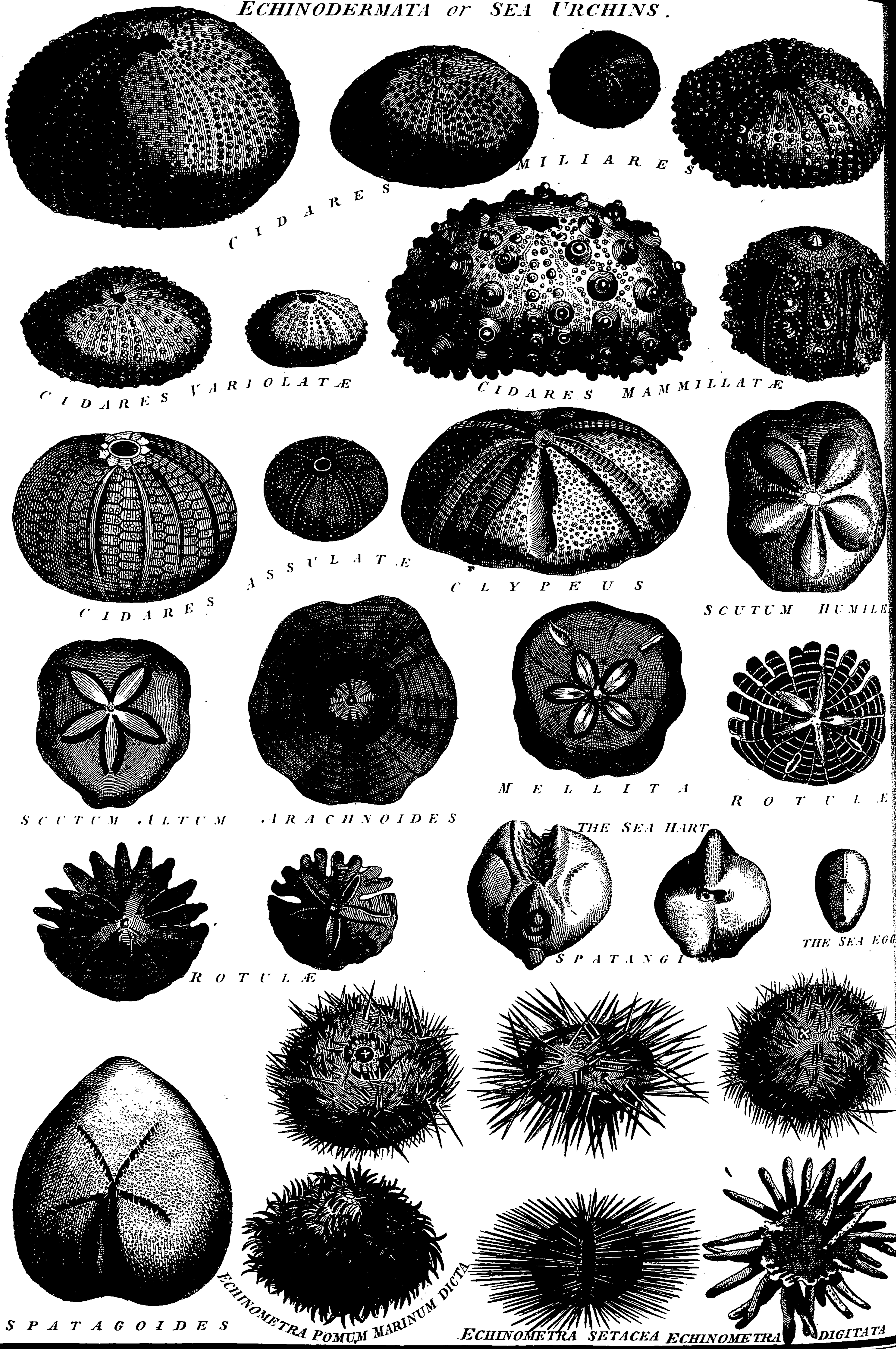
The Agate Chama



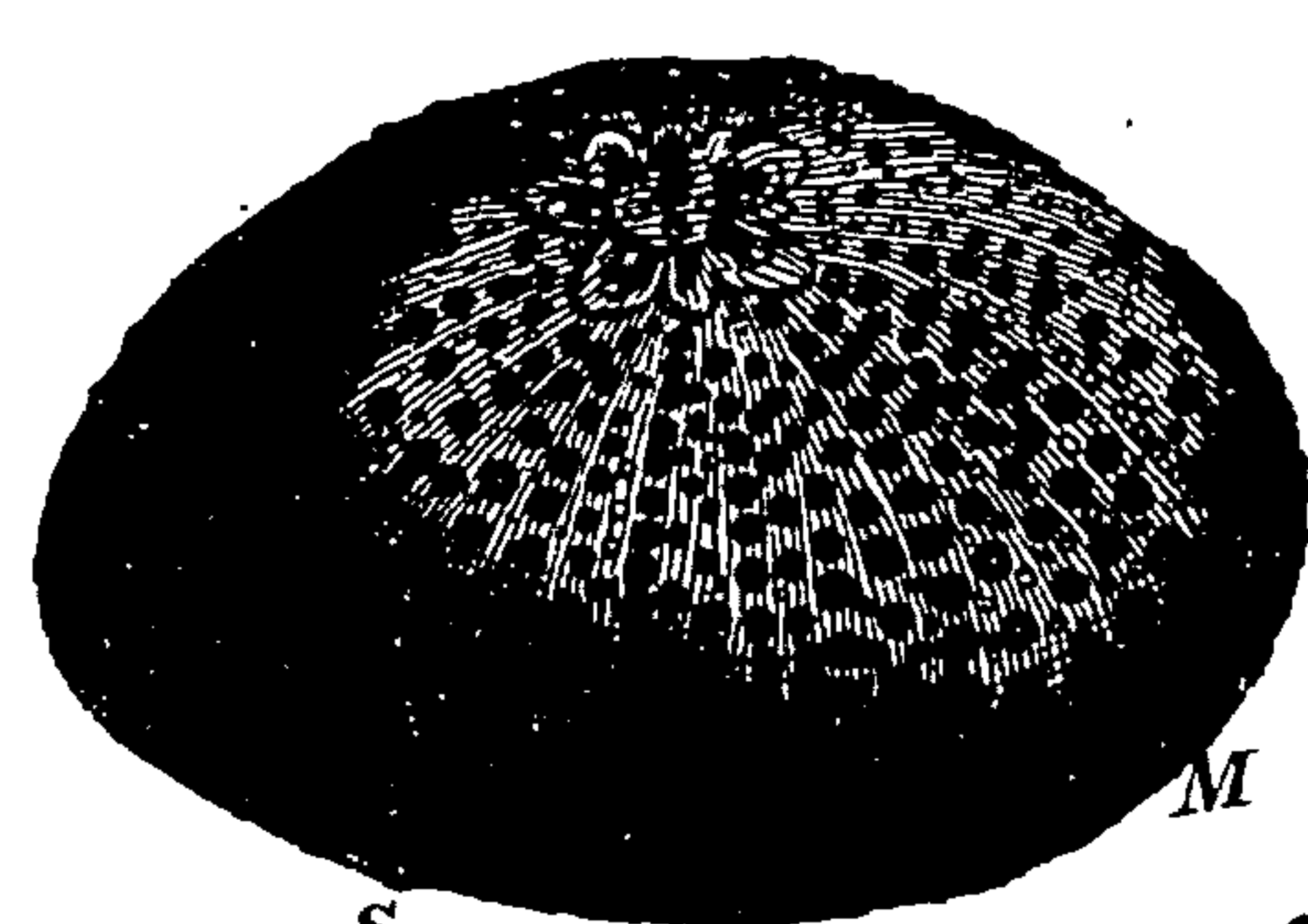
The Spider Shell

TESTACEOUS ANIMALS.

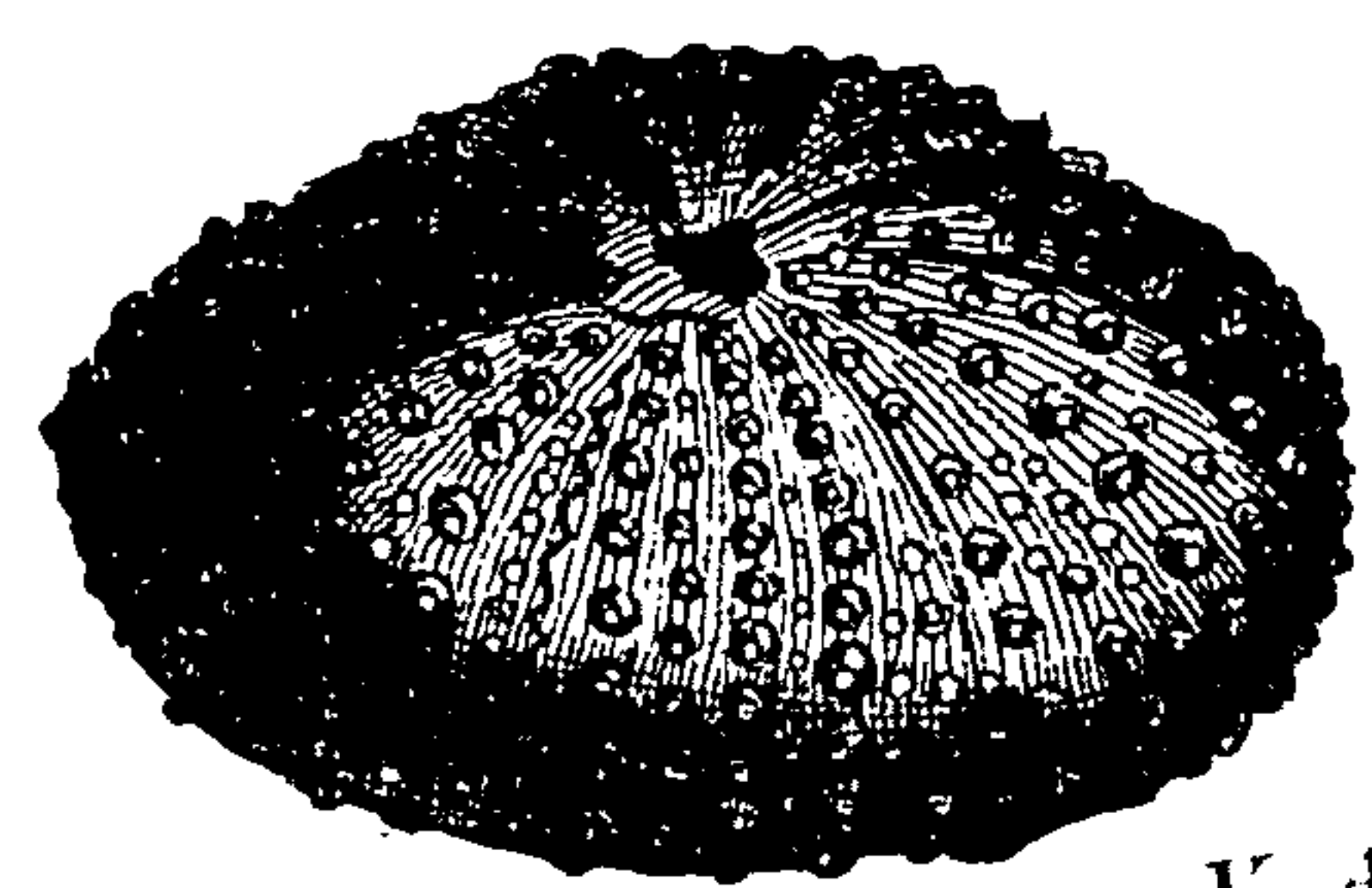
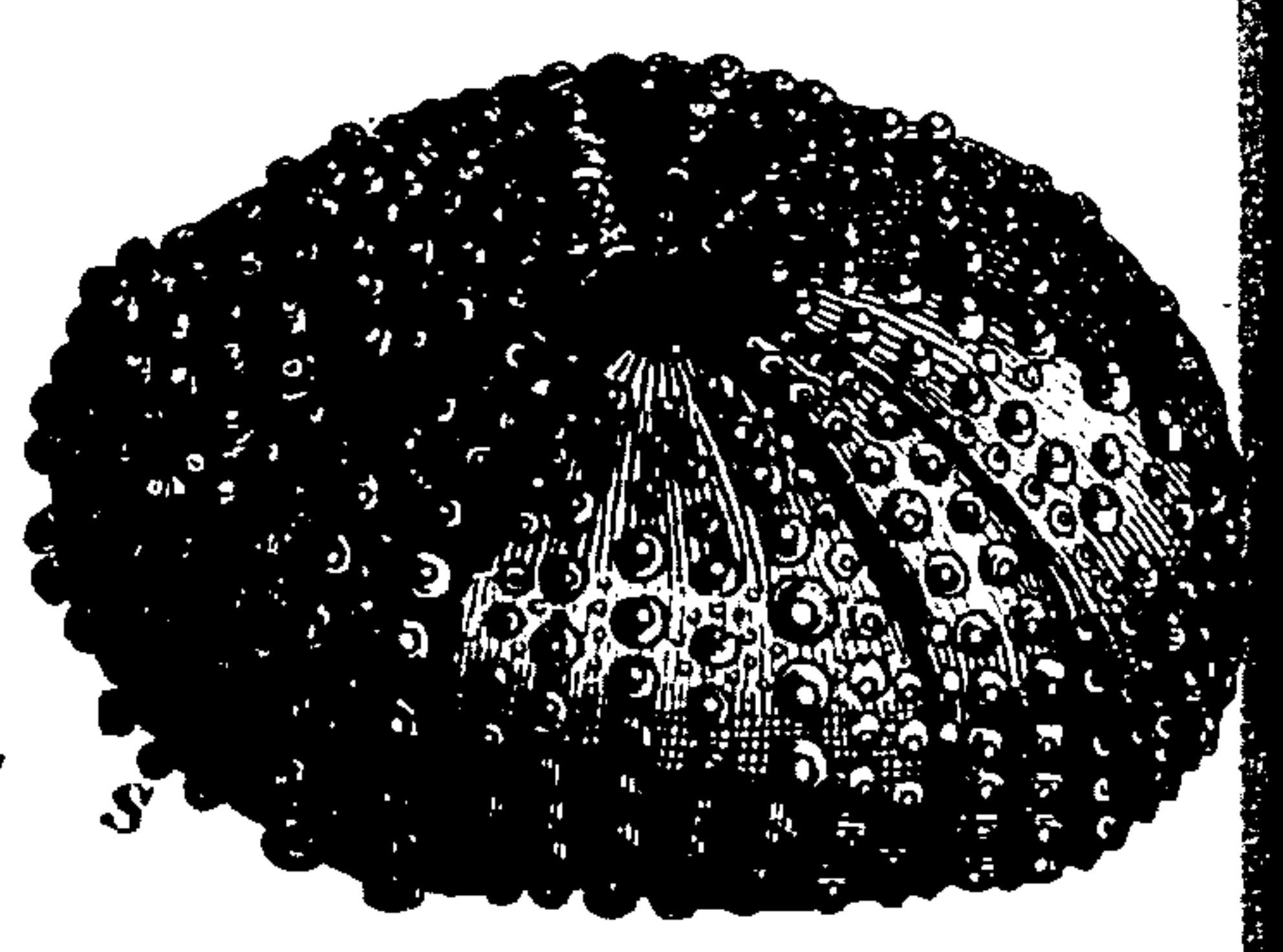
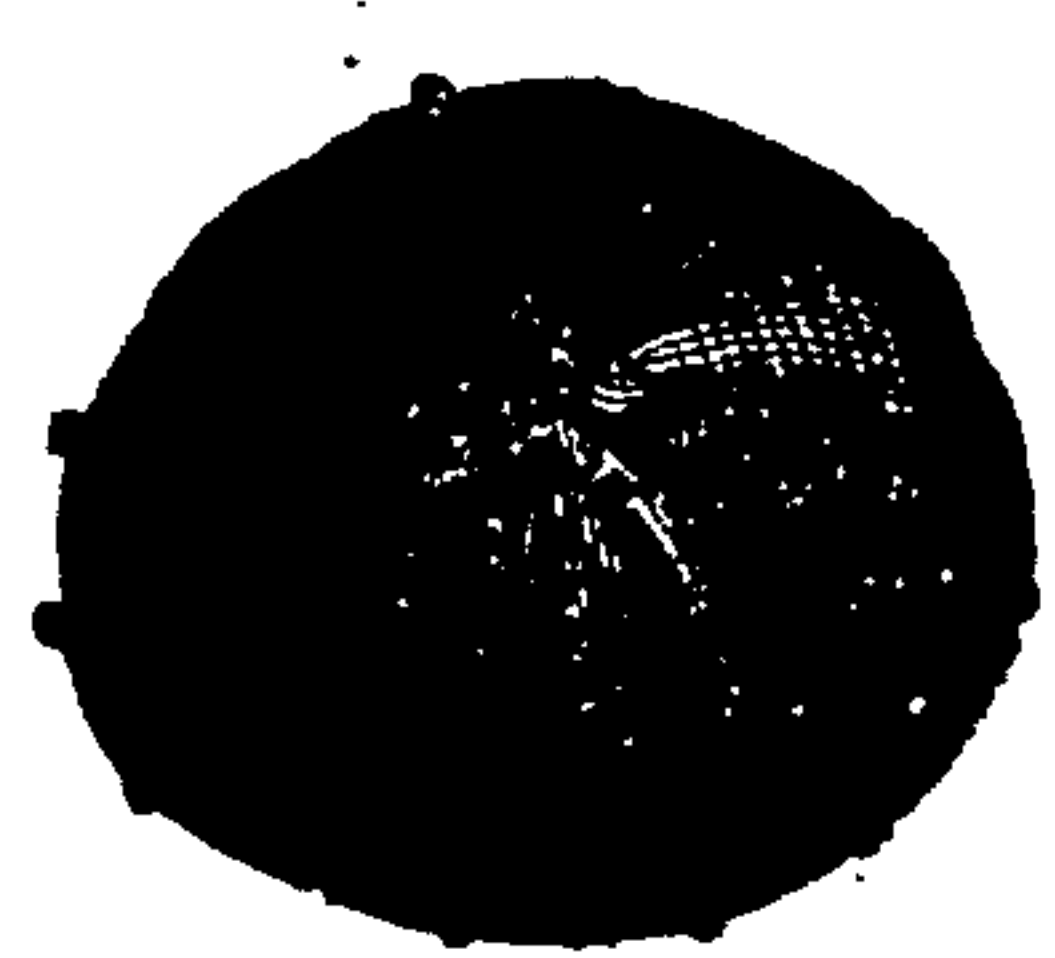
ECHINODERMATA or SEA URCHINS.



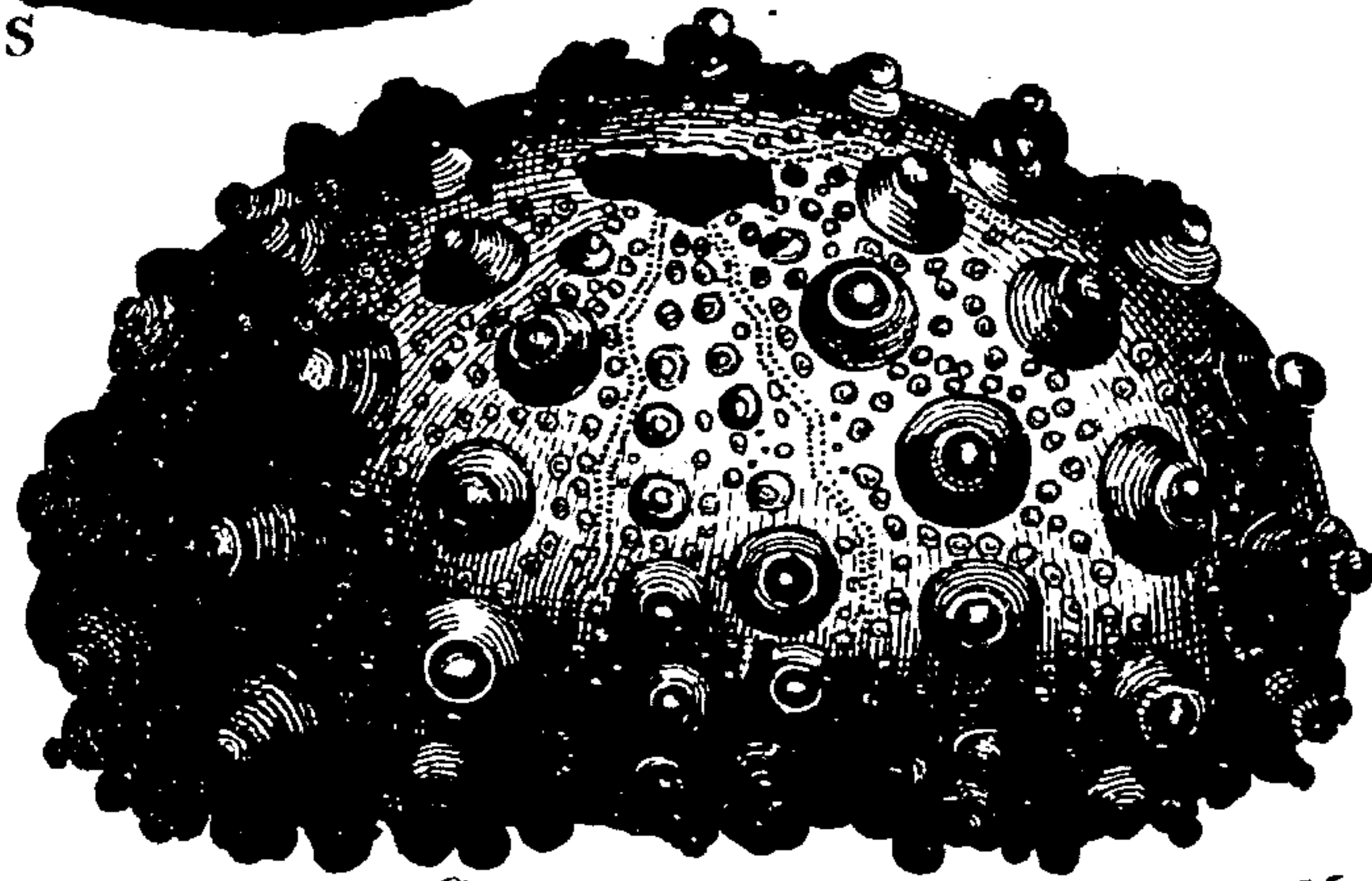
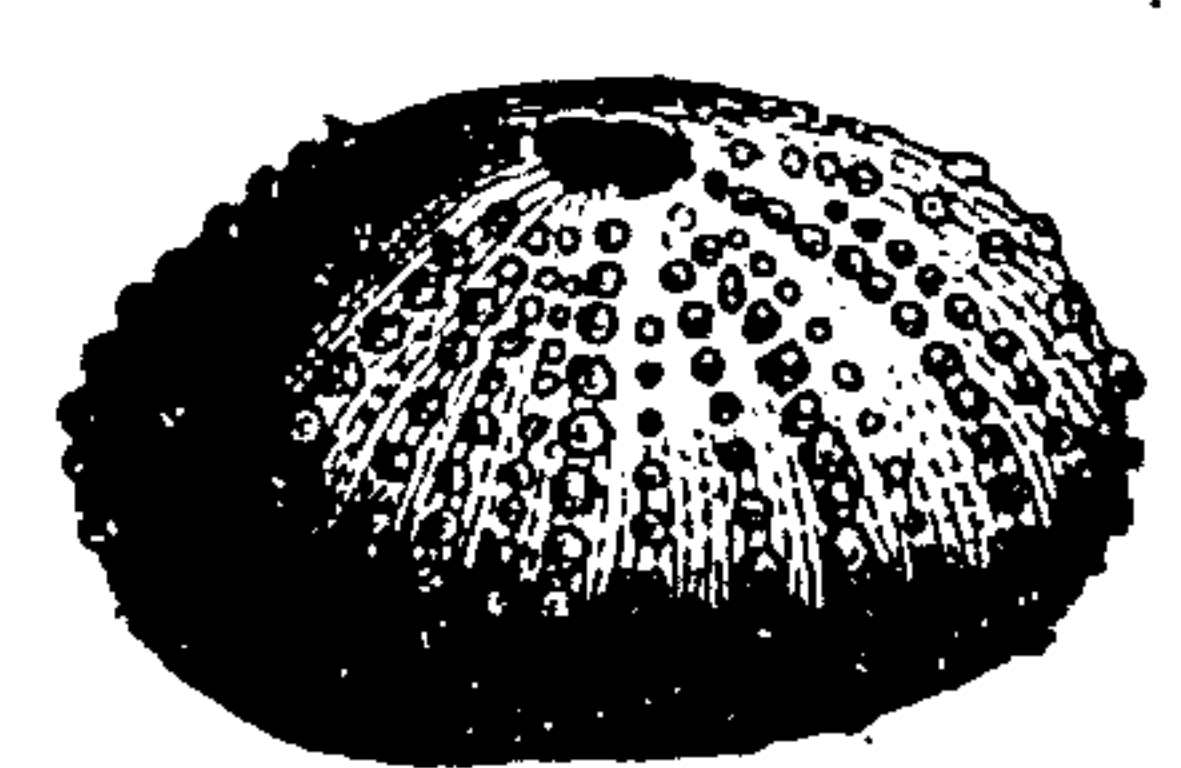
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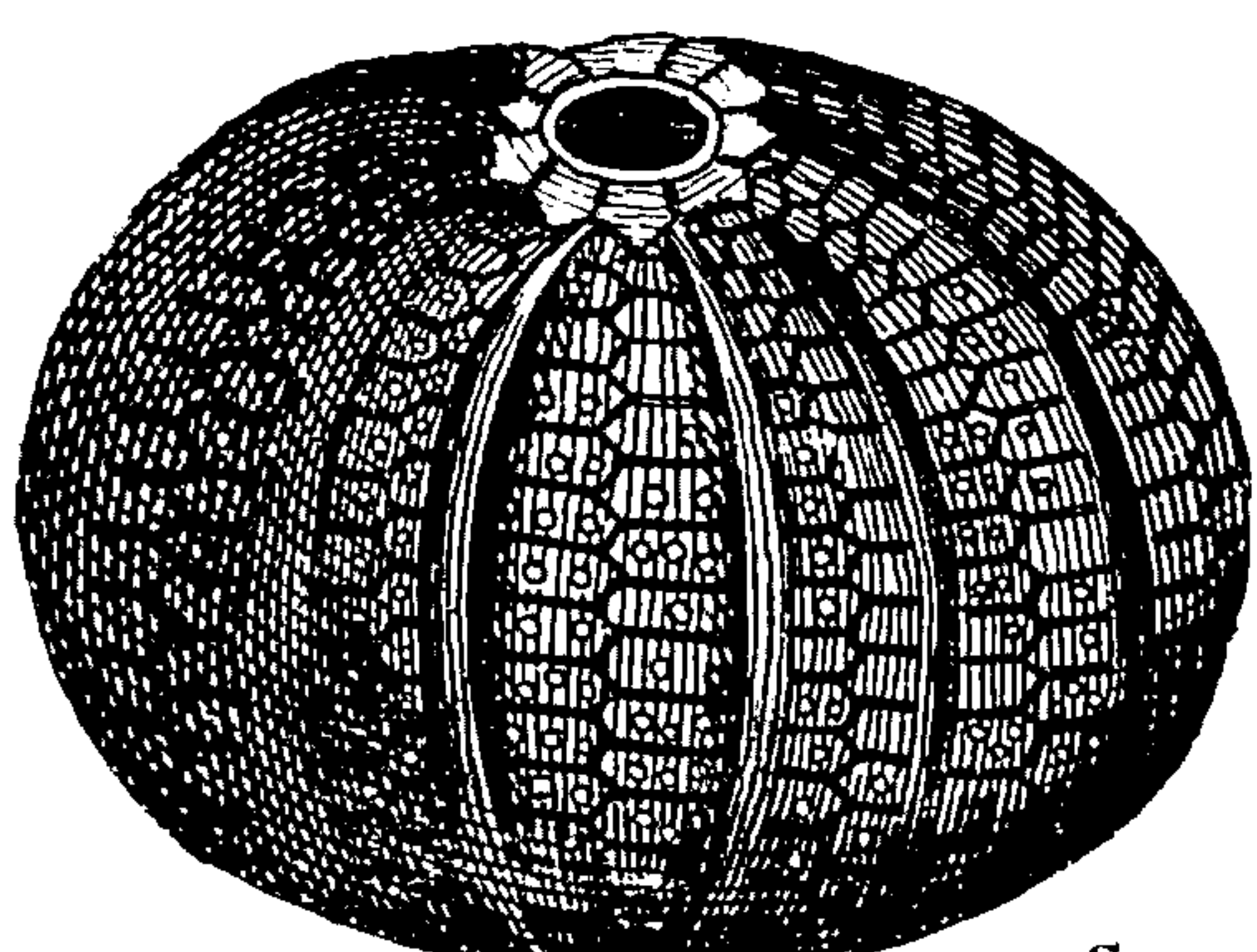
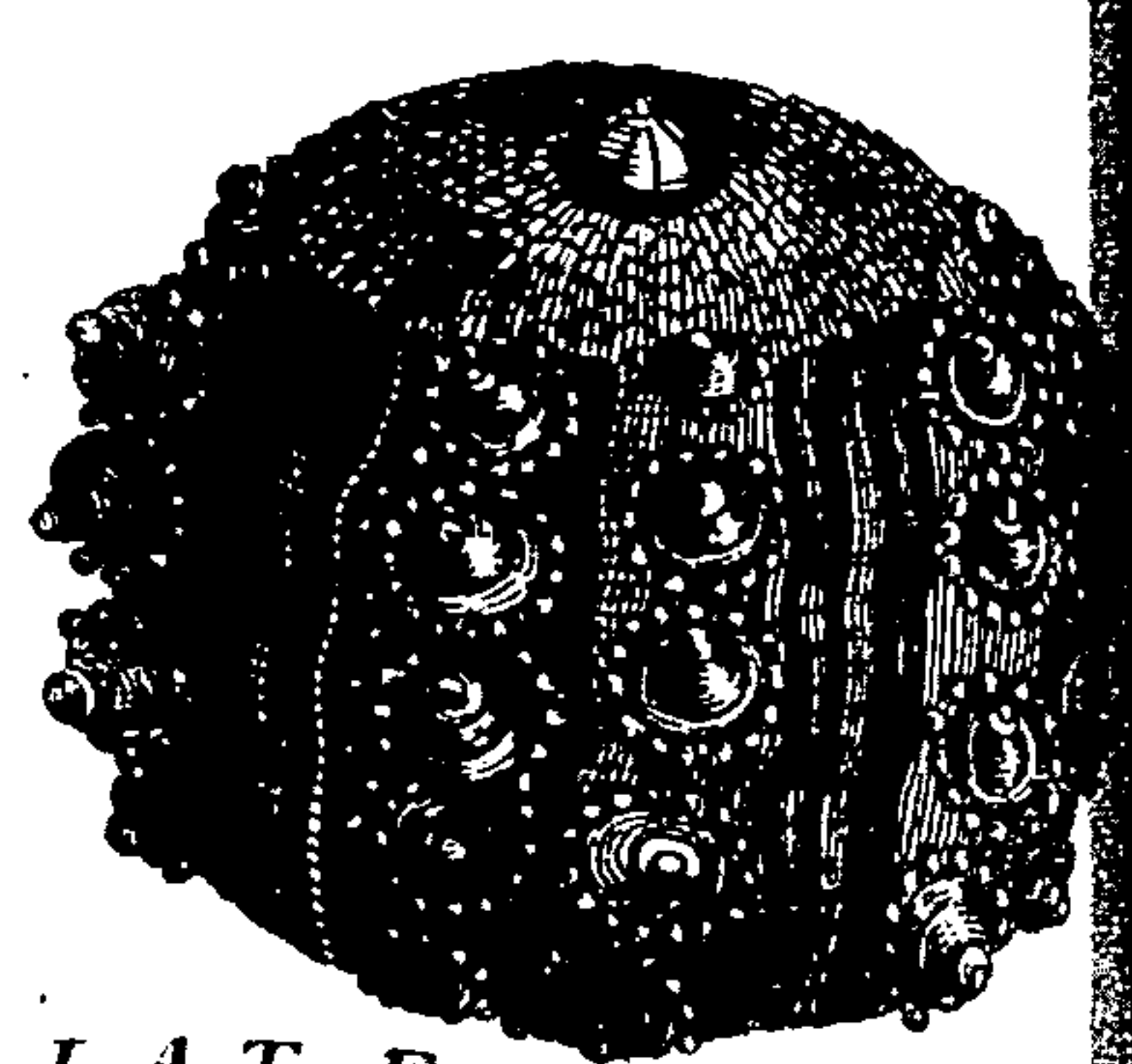
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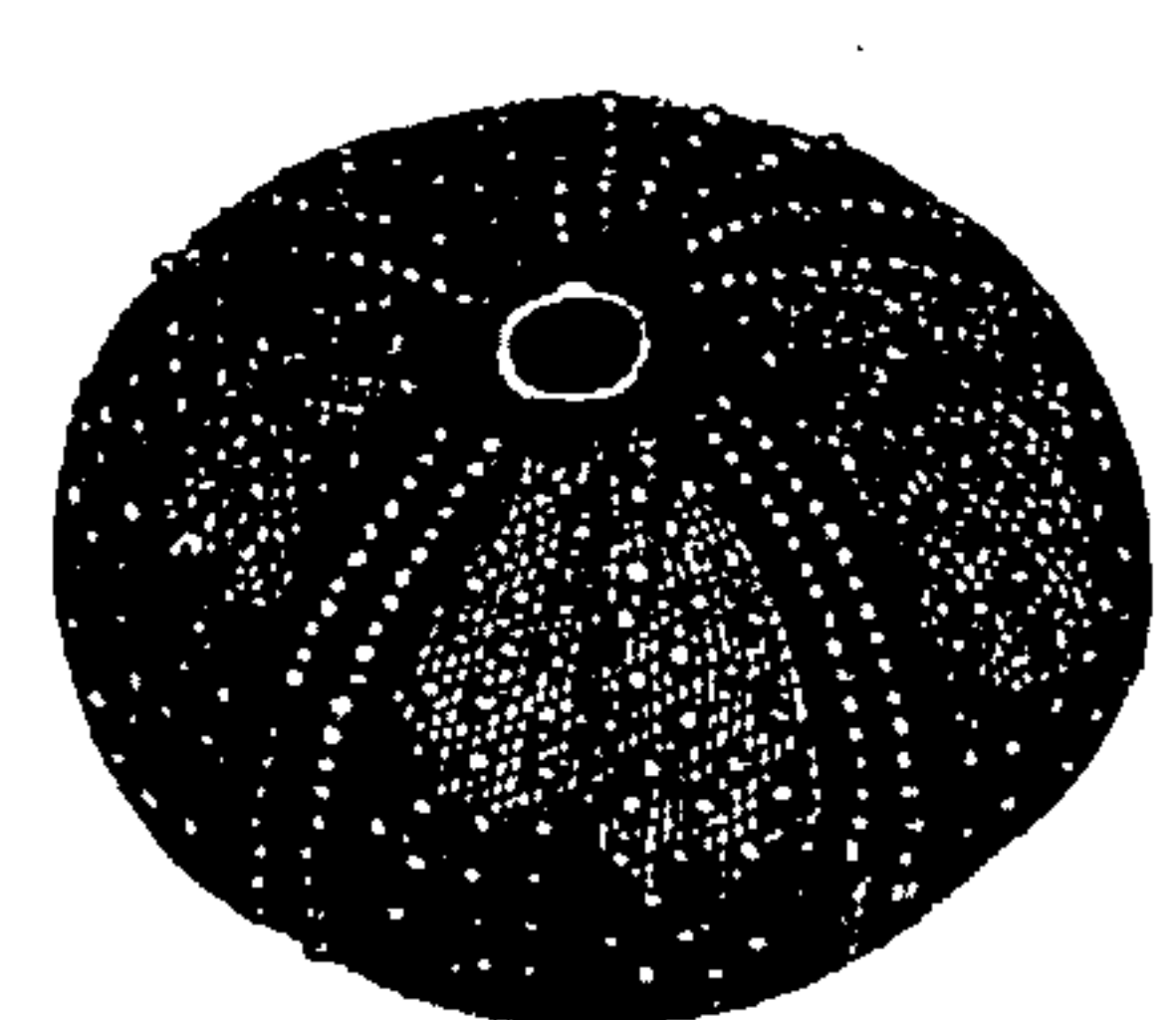
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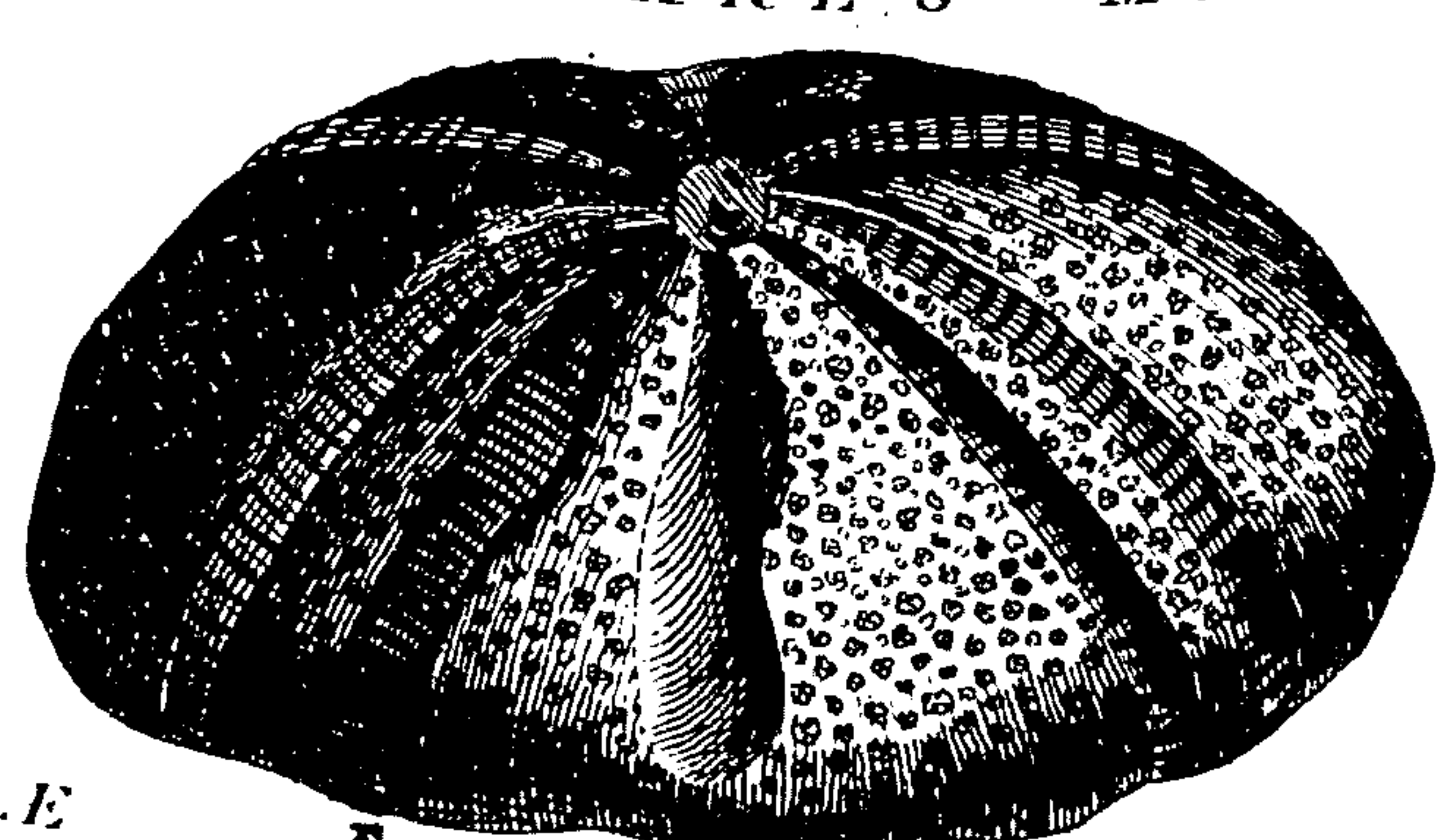
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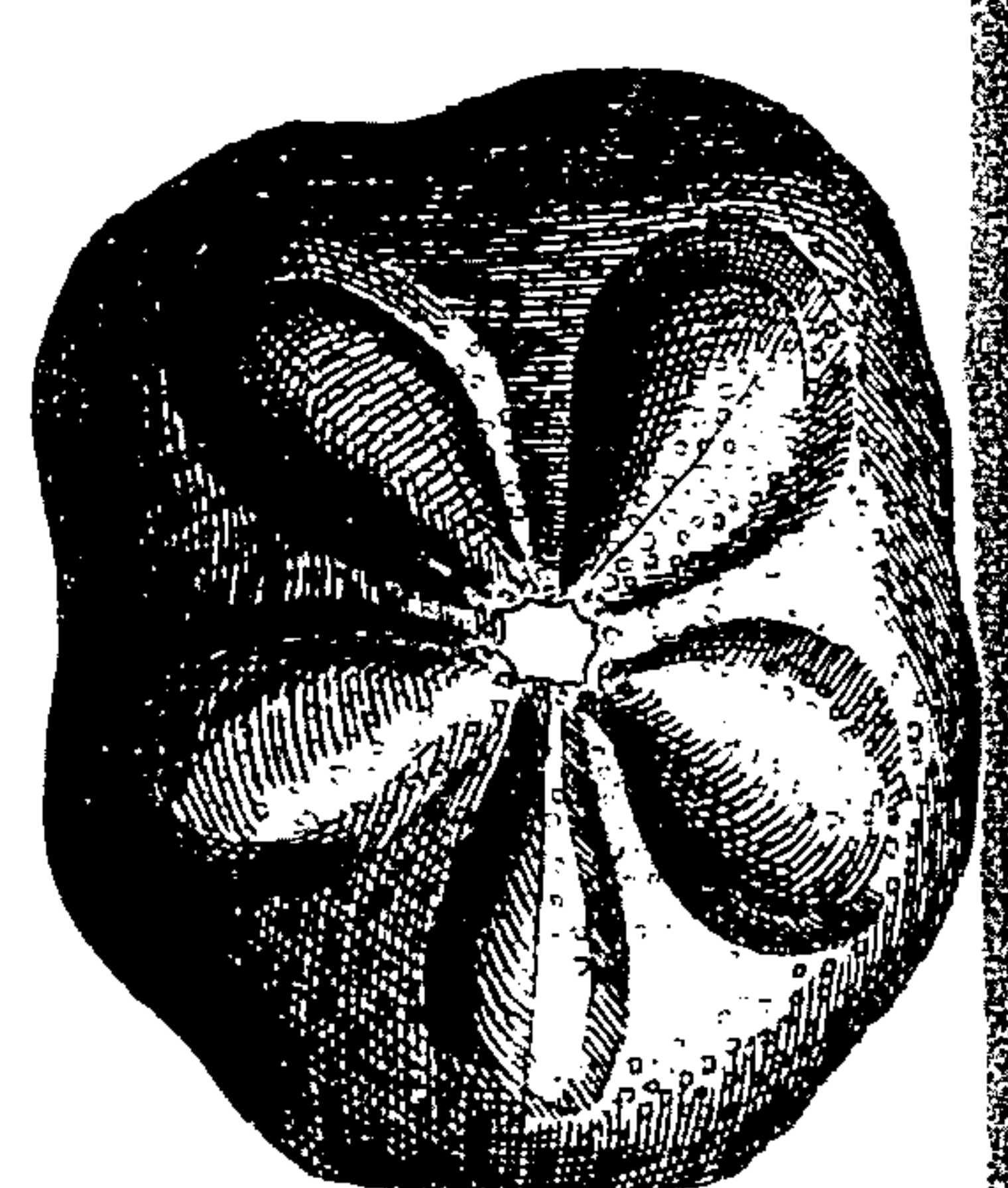
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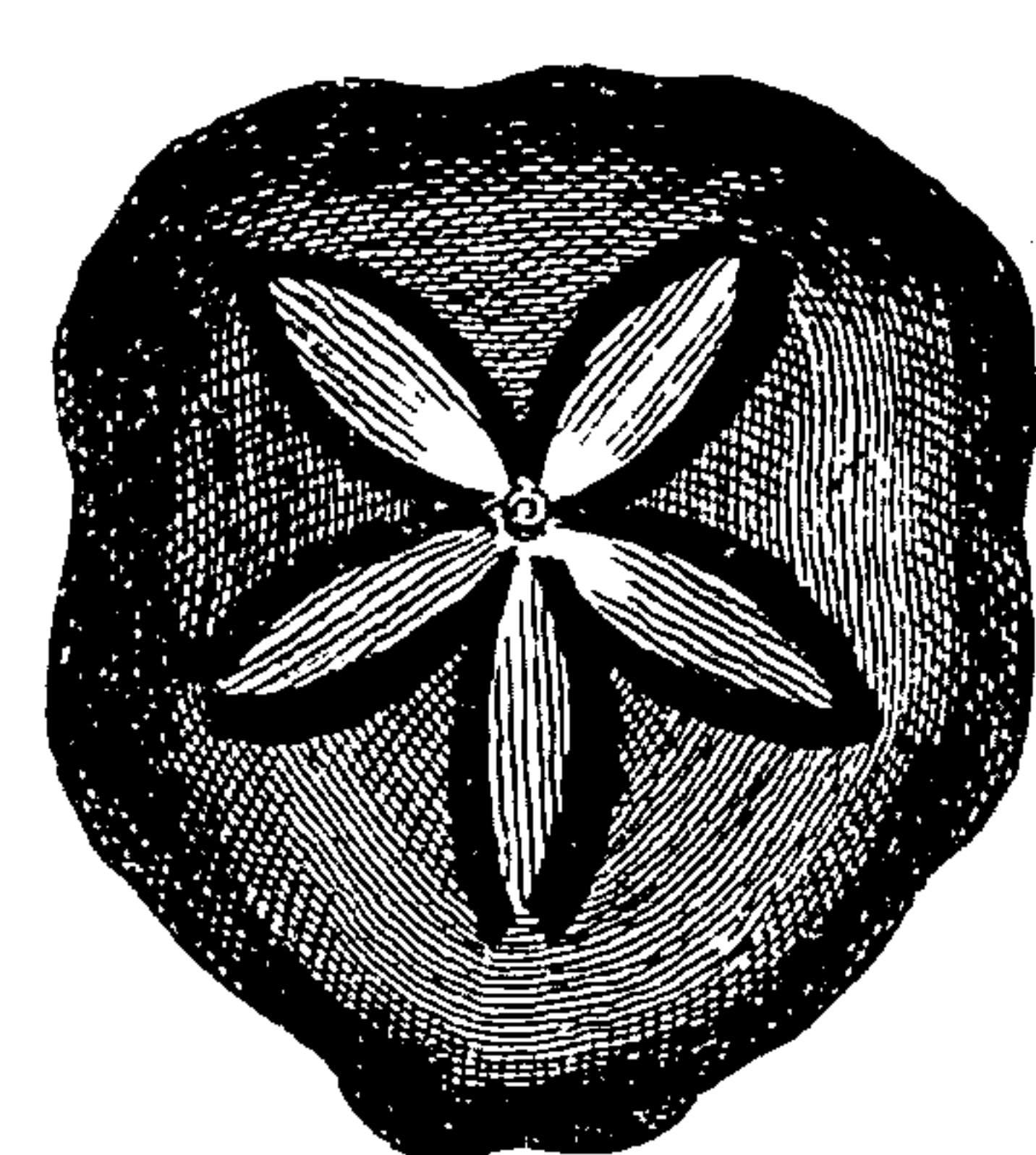
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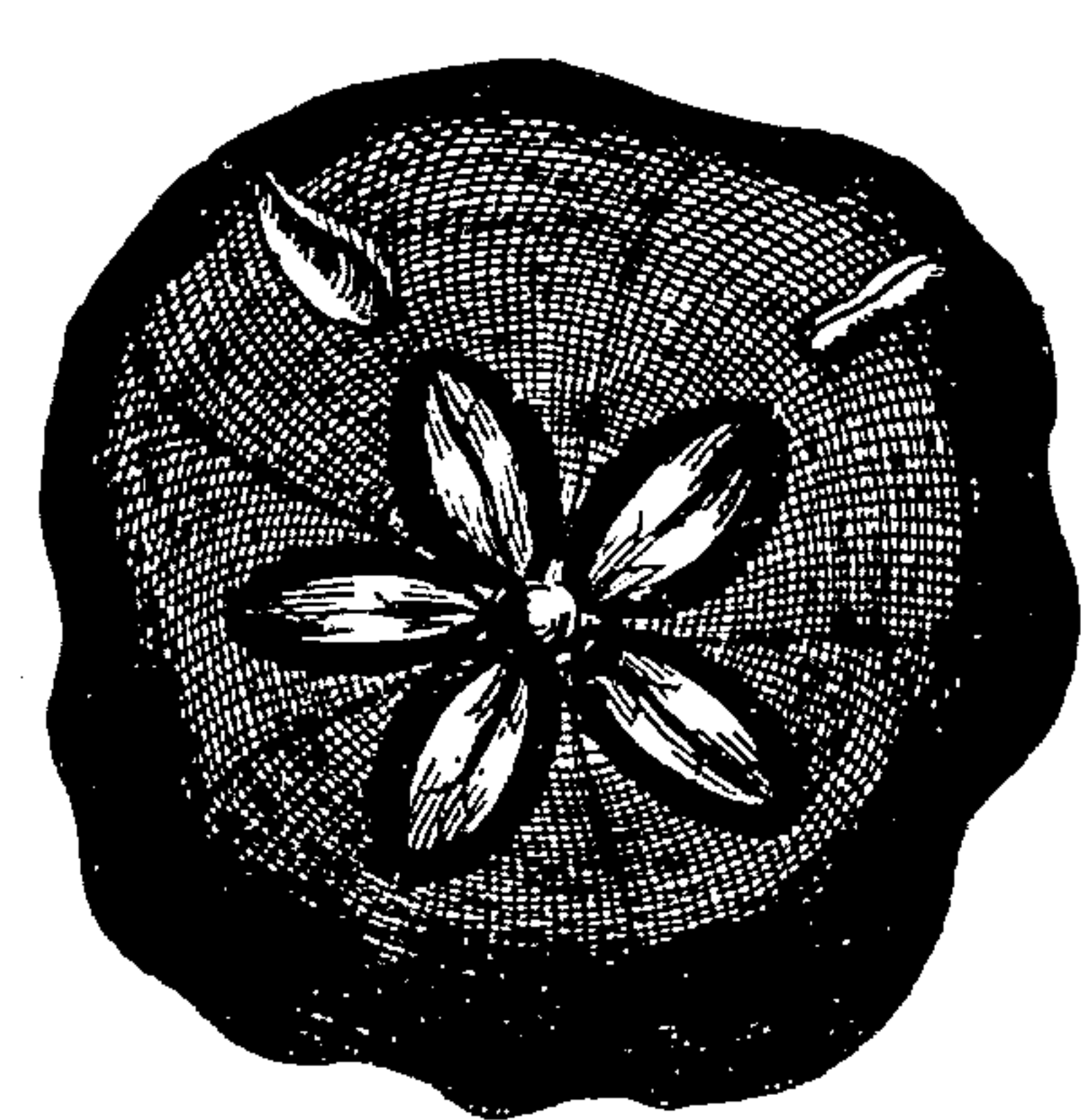
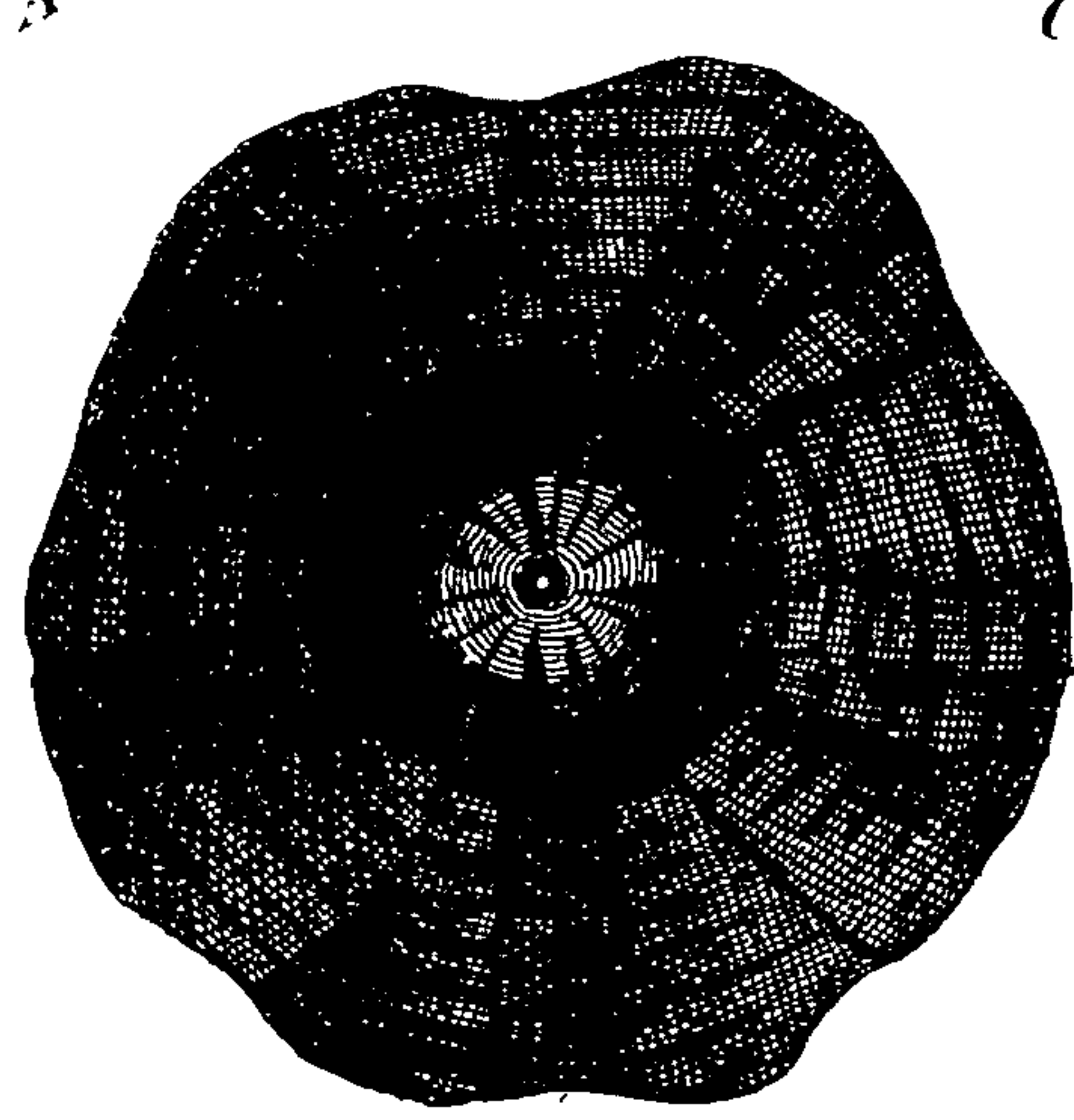
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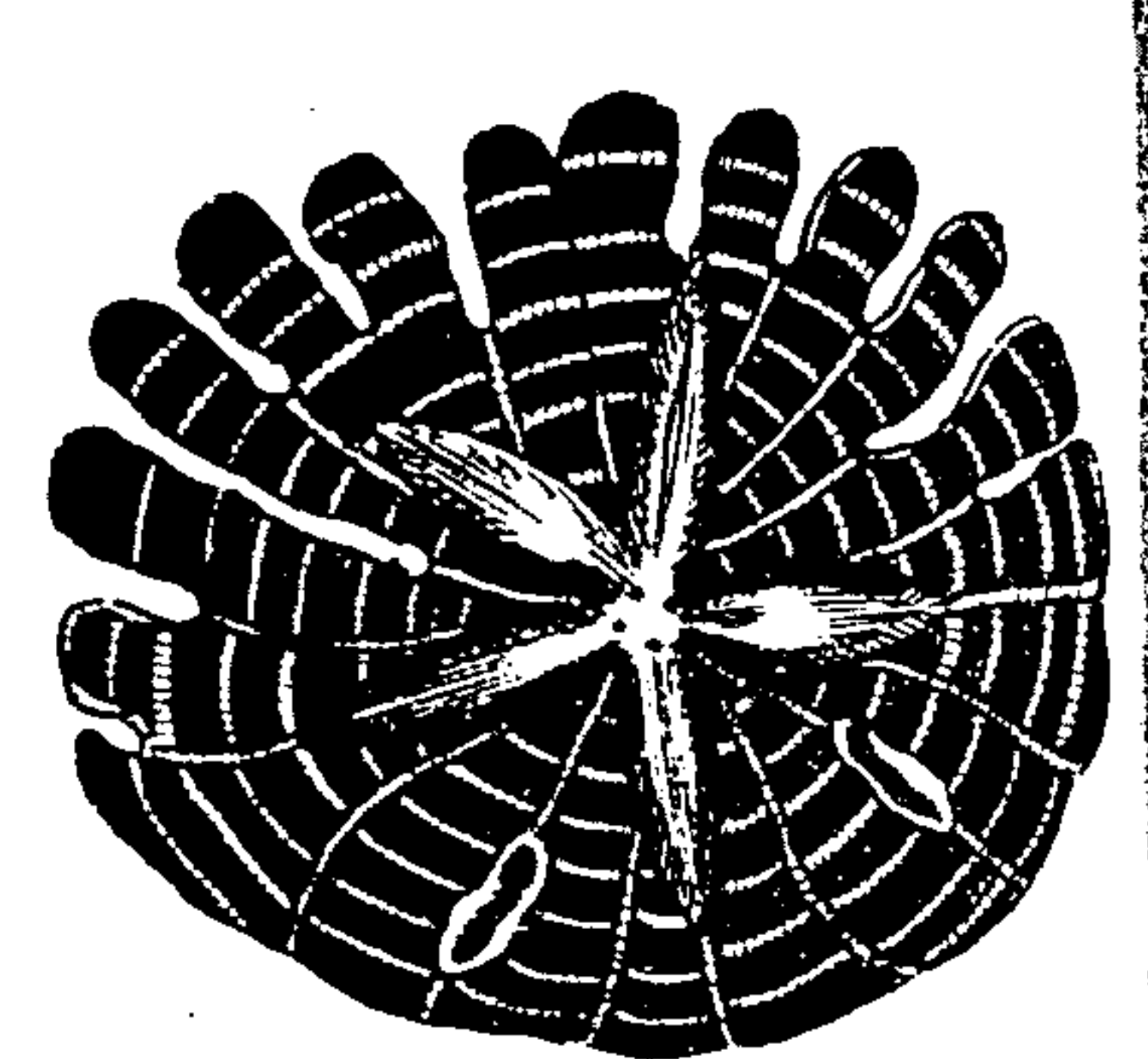
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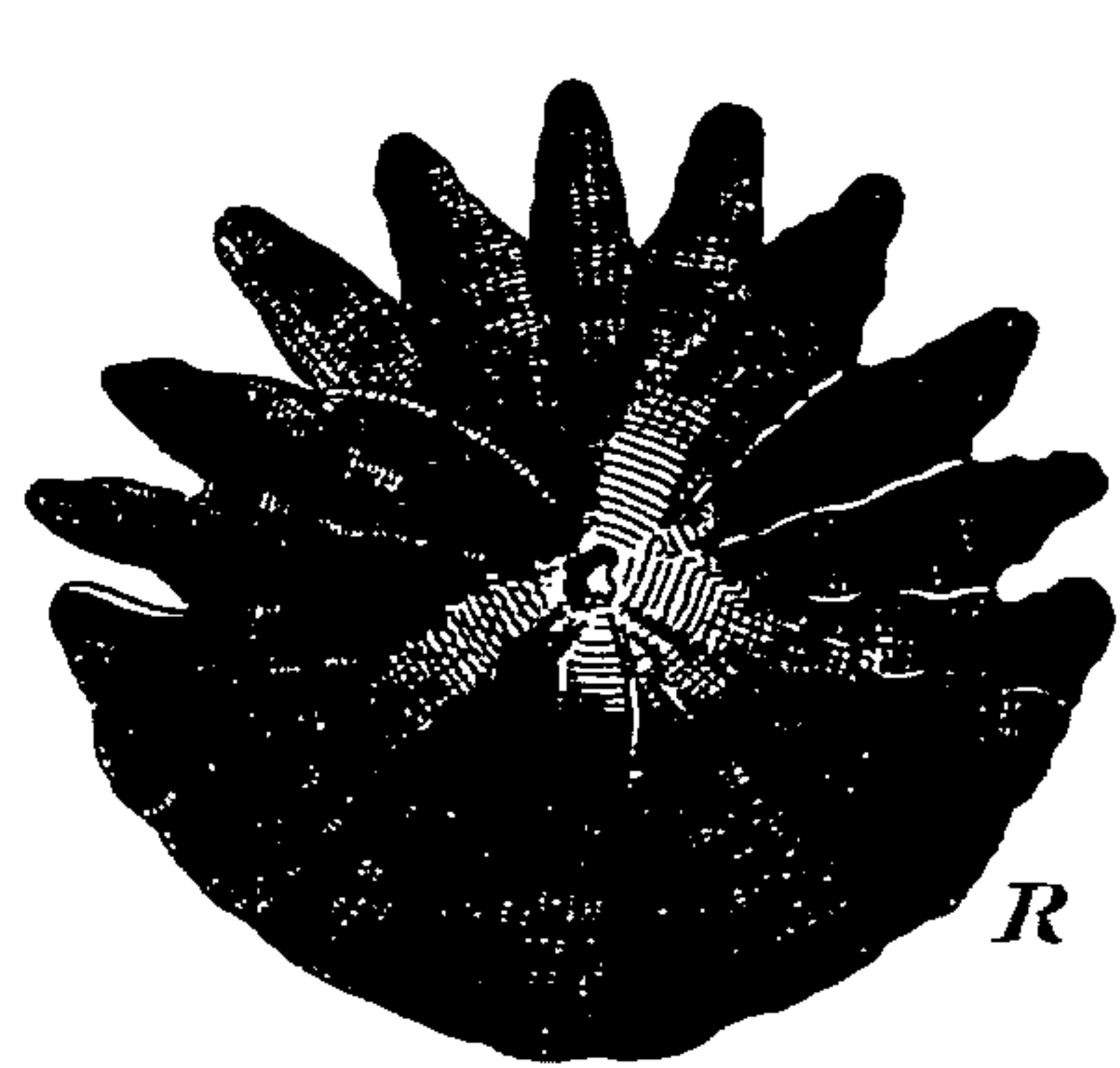
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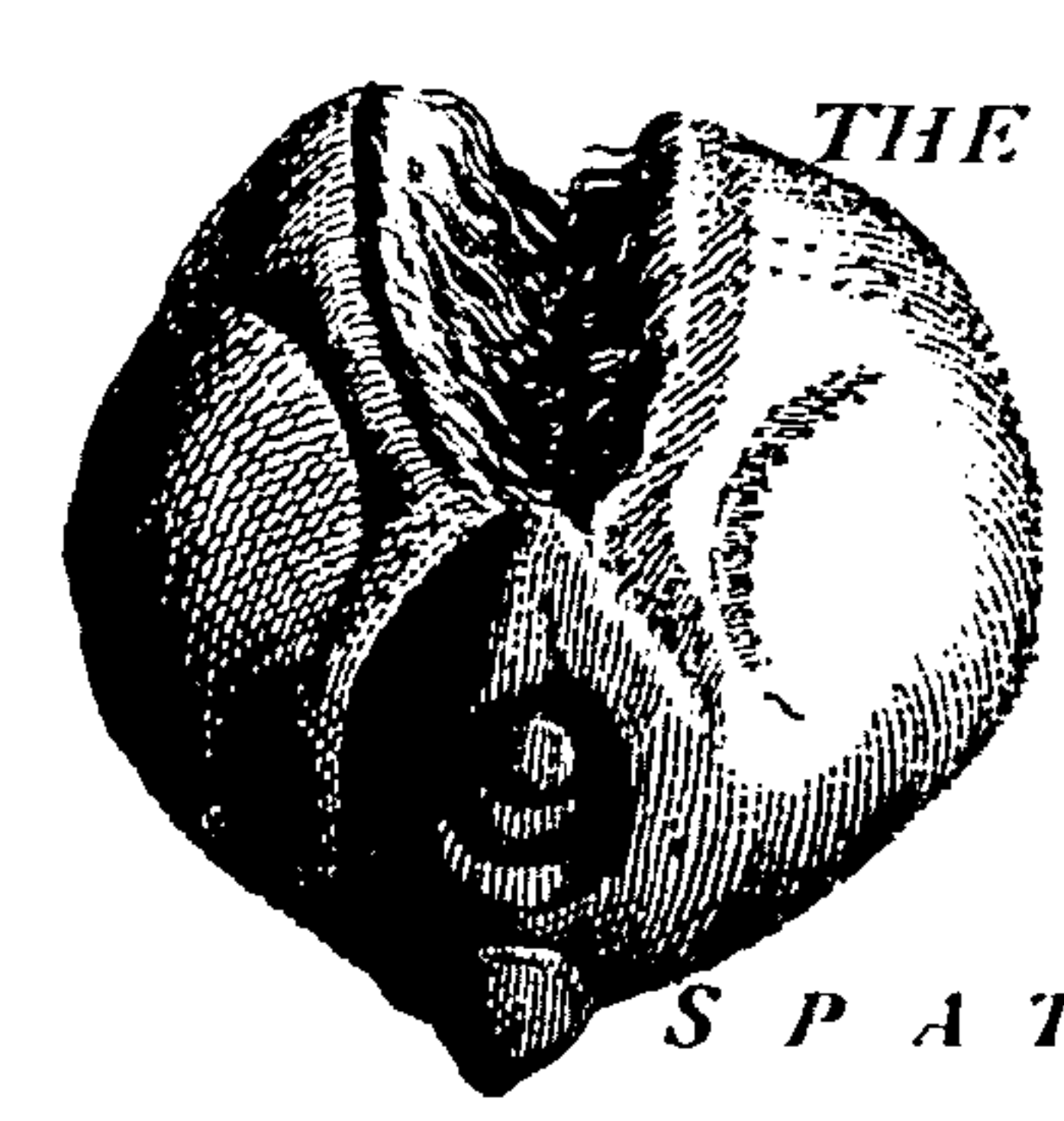
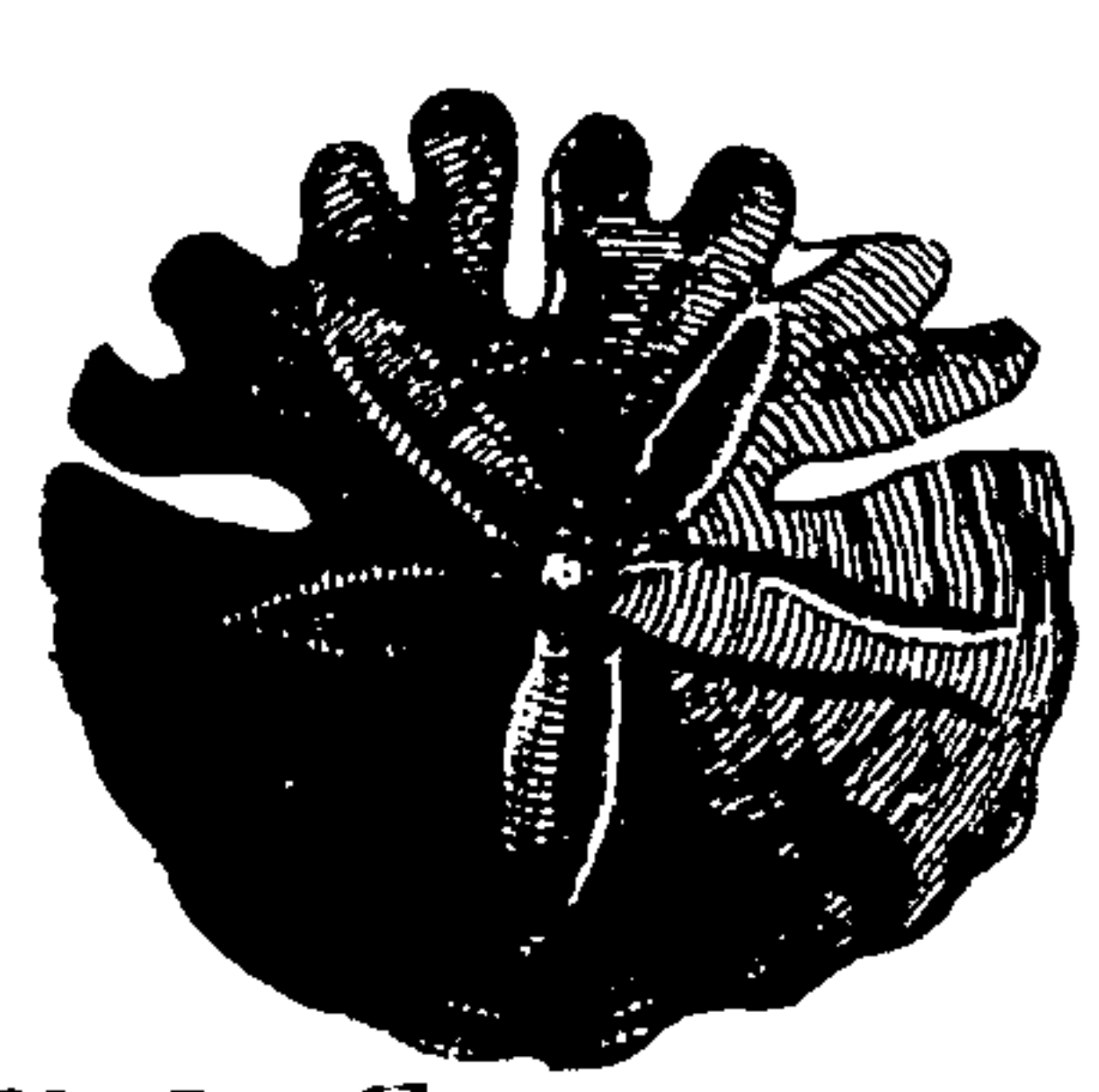
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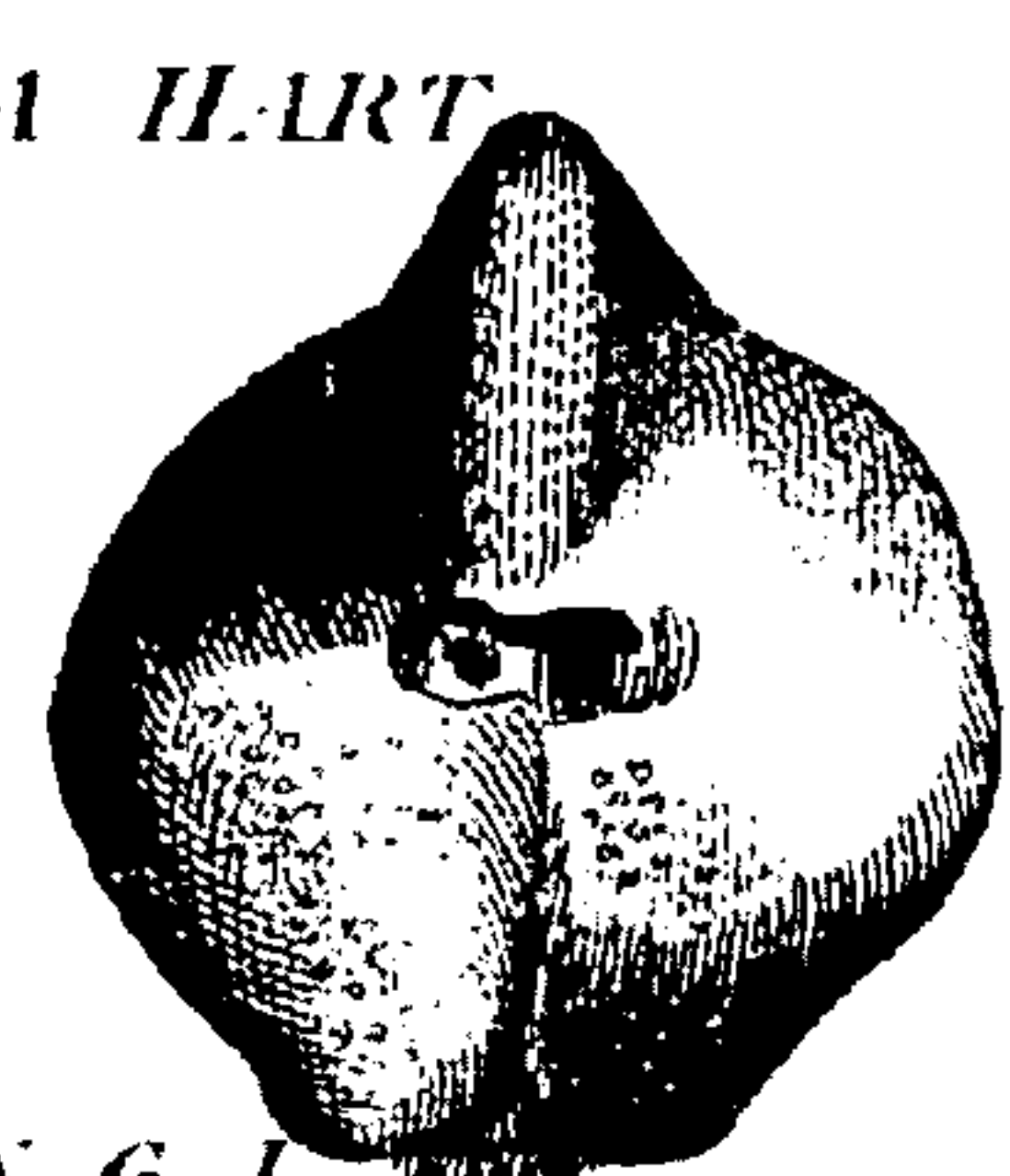
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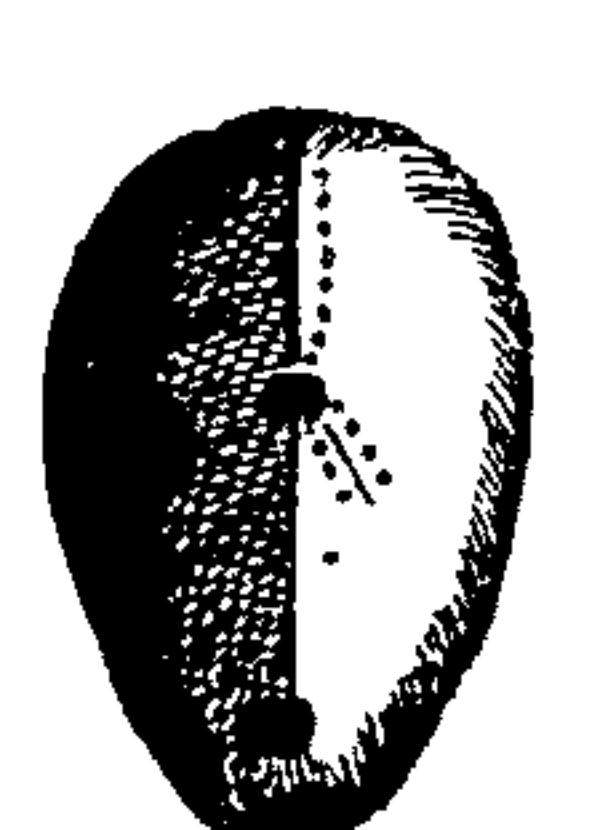
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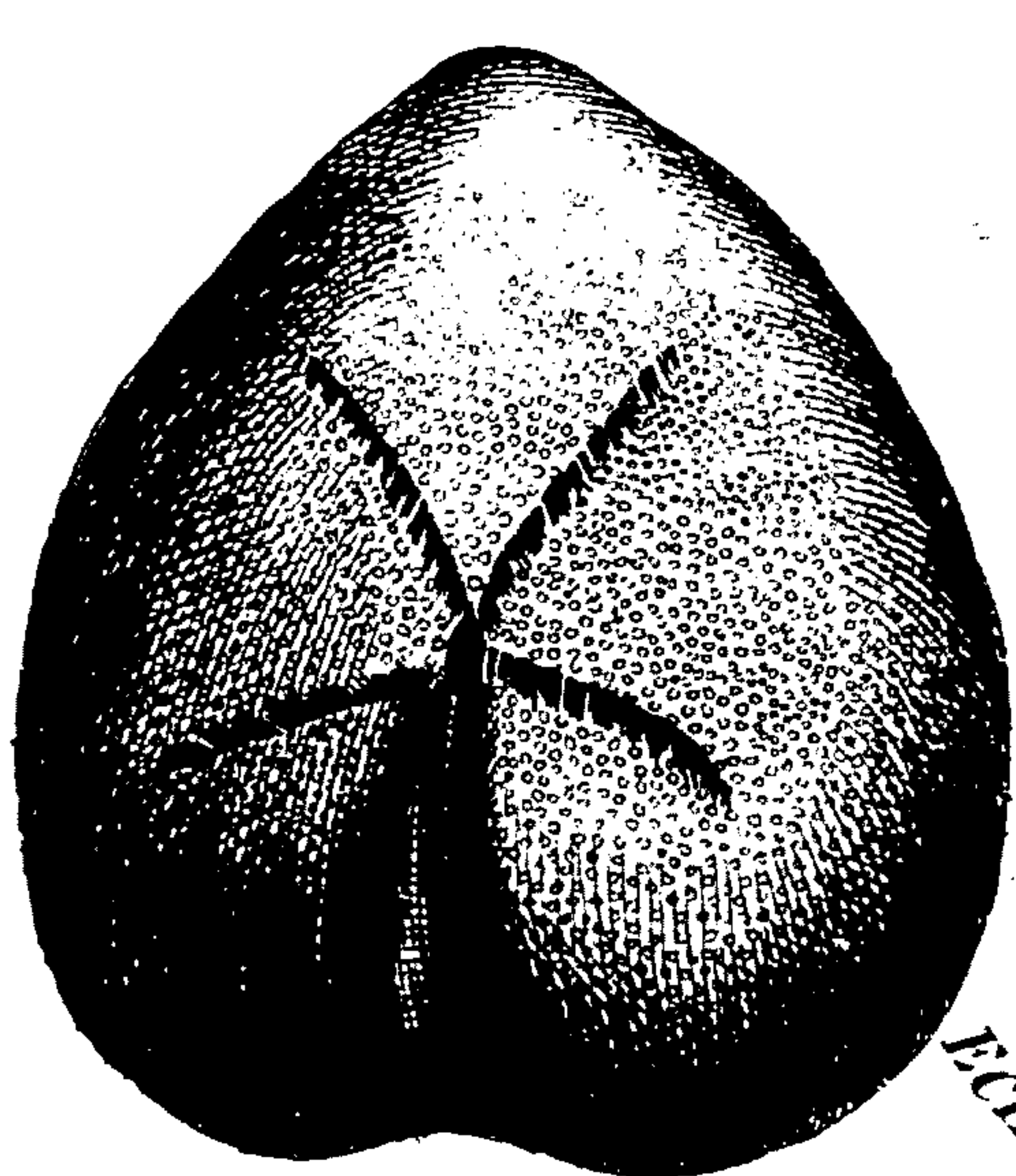
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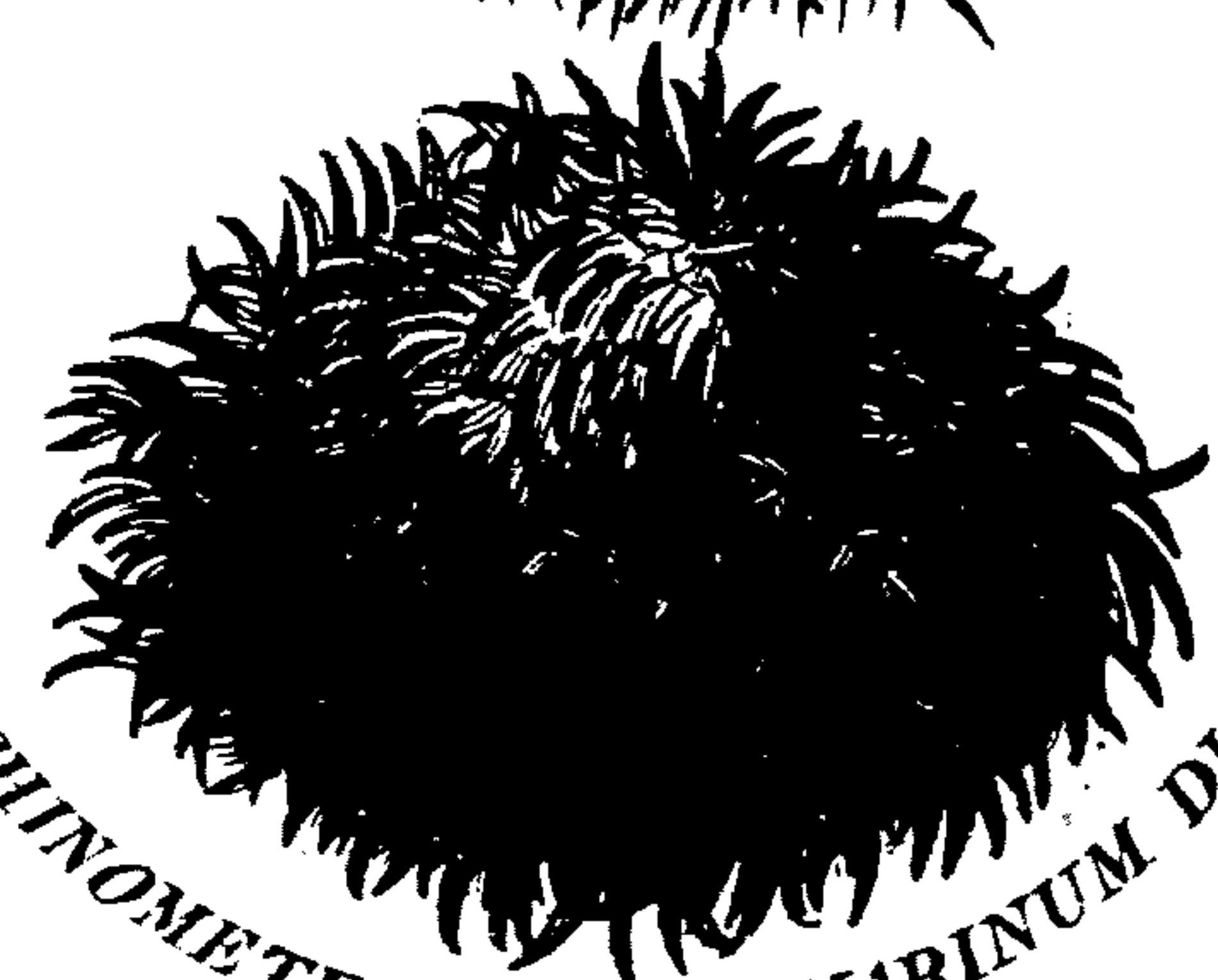
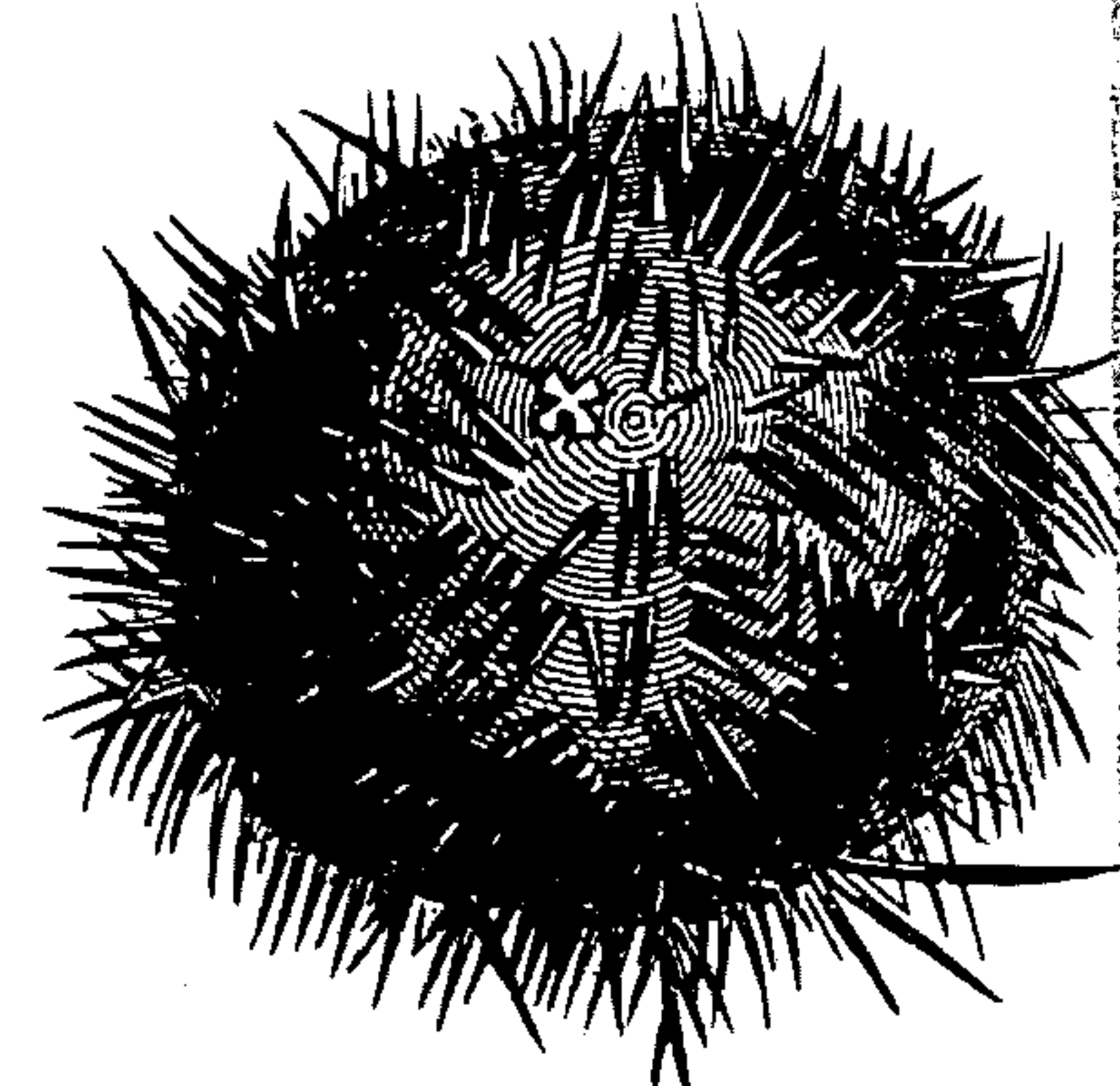
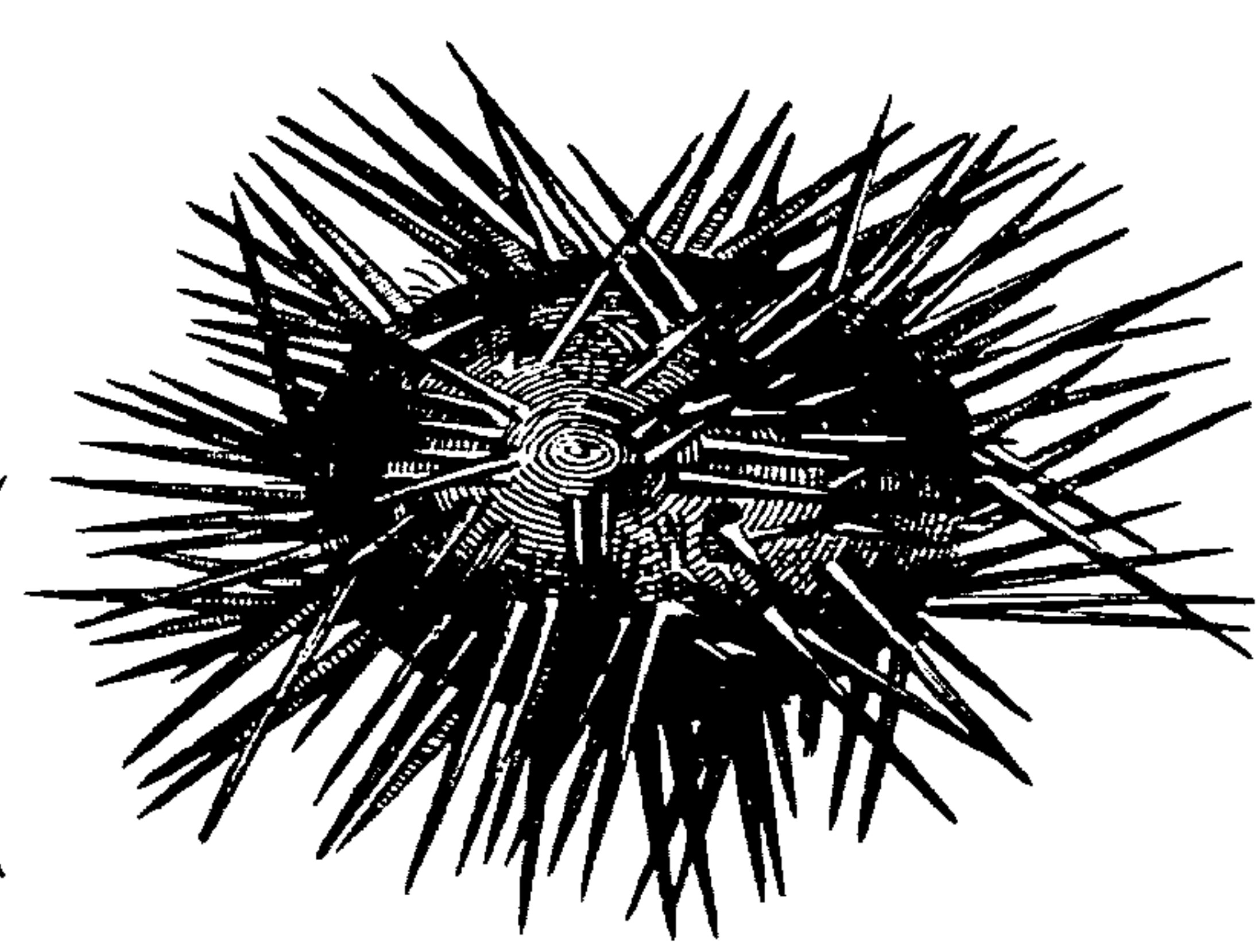
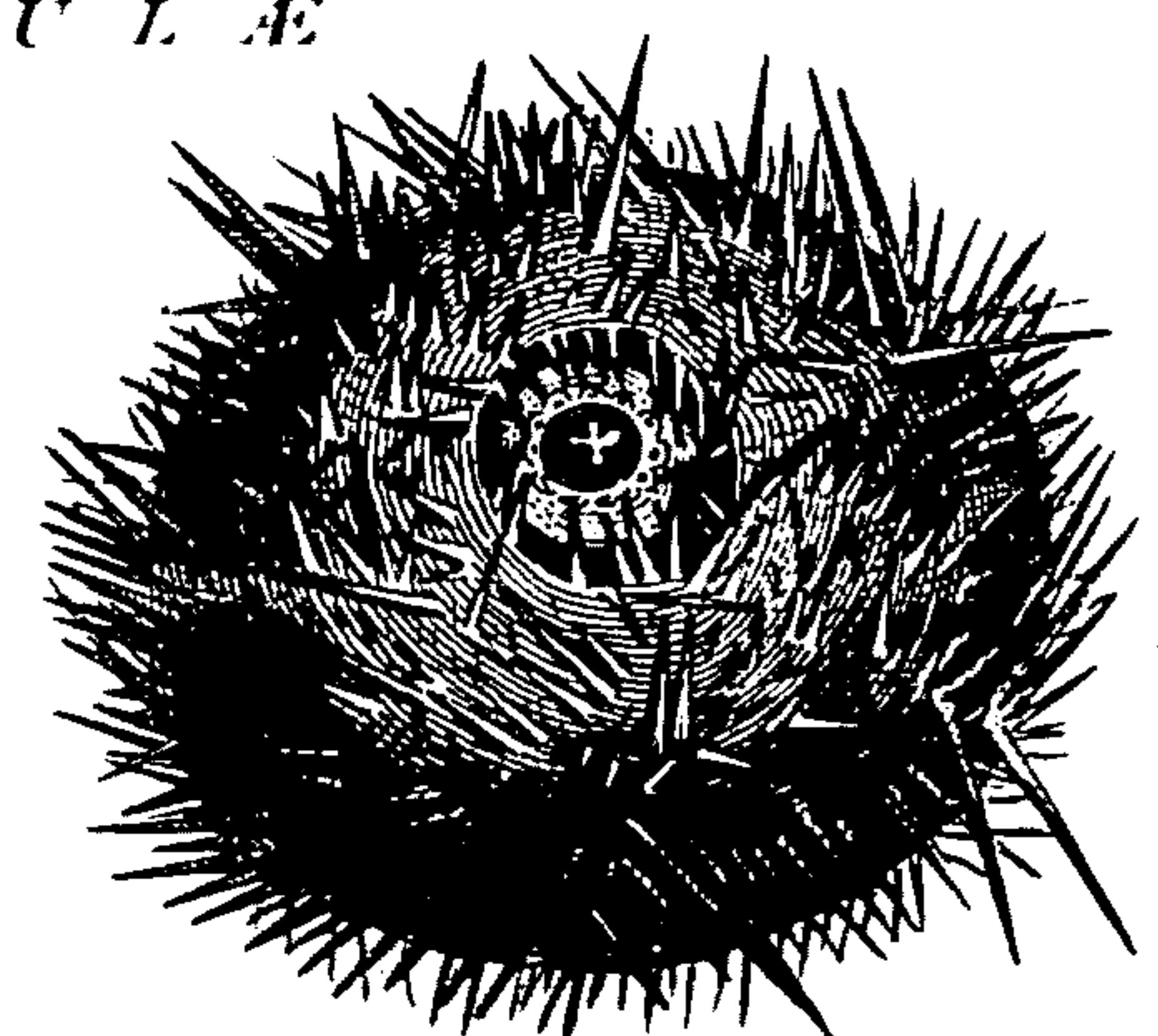
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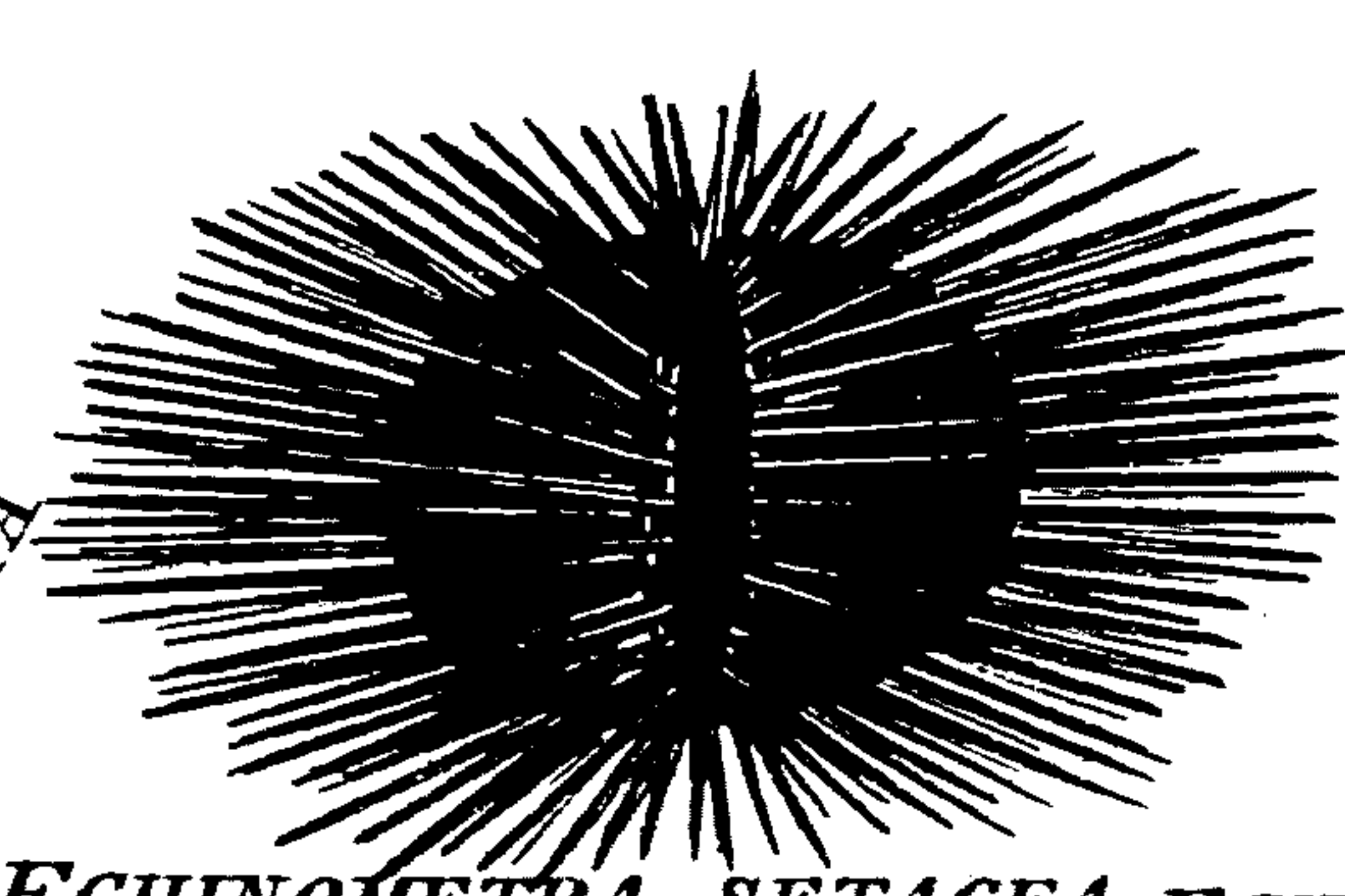
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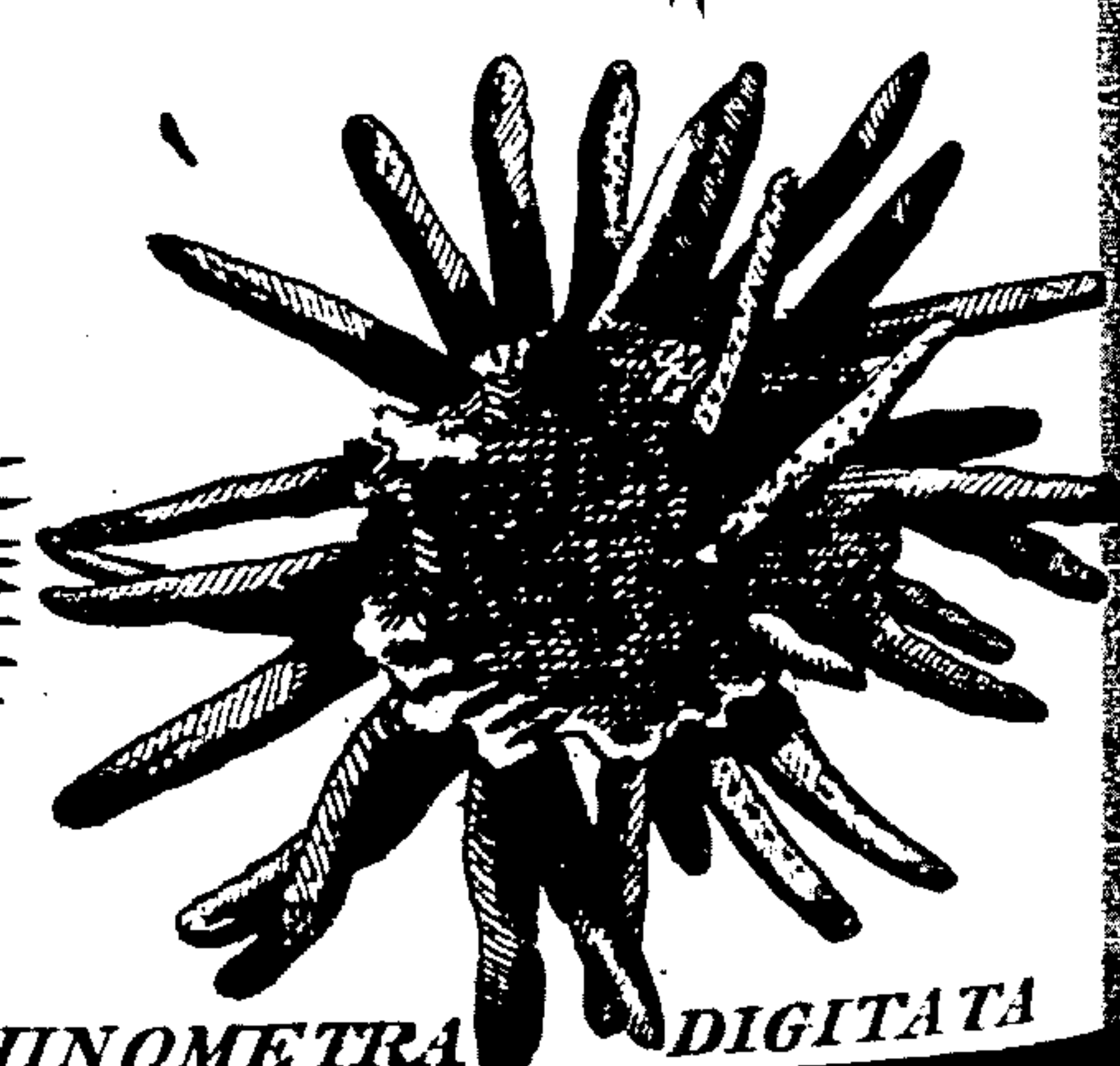
SPATAGOIDES



ECHINOMETRA POMUM MARINUM DIGITA



ECHINOMETRA SETACEA ECHINOMETRA



DIGITATA



A VIEW of the PEARL-FISHERY.

Lodge sculp.

are brought from the east: they are whiter and more regular than the American pearls; but they all become yellow in time. When kept in damp places they decay, and moulder into a substance not much harder than chalk. The greatest pearl-fisheries are in America and Asia; but as pearls are less valuable than they formerly were, those of America are in a great measure discontinued.

NATURAL HISTORY of the SEA URCHIN.

AT the first view, the Sea Urchin may be compared to the husk of a chesnut; being like it in shape, and having a number of bony prickles standing out on every side. The mouth is placed downwards; the vent is above; the shell is a hollow base, resembling a scooped apple, and is filled with a soft muscular substance, through which the intestines wind from the top to the bottom. The mouth, which is large and red, is furnished with five sharp teeth, which are easily discerned. It is principally remarkable on account of its horns and spines, which point from every part of the body, like the horns of a snail, and serve at once as legs to move upon, as arms to feel with, and as instruments of capture and defence.

It is in general observed of insects, that those which have the greatest number of legs, always move the slowest; this animal, however, is an exception to the general rule; for though it is furnished with two thousand spines, and twelve hundred horns, all serving for legs, and from their number seeming to impede each other's motion, yet it moves at the bottom with some degree of swiftness. Some kinds of this animal are as good eating as the lobster, and its eggs, which are red, are esteemed a great delicacy.

The acorn shell fish, the thumb-footed shell fish, and the imaginary barnacle, resemble the Sea Urchin in shape, but are very different in motion. They are fixed to one spot, and appear to vegetate from a stalk. To an inattentive spectator, each appears to be a kind of fungus that grows in the deep, destitute of animal life as well as motion: but it has a cover, by which it opens and shuts its shell at pleasure. It has twelve long crooked arms, furnished with hair, which it thrusts forth for its prey; and eight smaller, which are generally kept in the shell.

But of all animals of the shelly tribe, the pholas is the most wonderful. The pholas assumes different figures; but in general it somewhat resembles a muscle; except that the shell is composed of five or more pieces; the smaller valves serving to close up the openings, left by the irregular meeting of the two principal shells. But the most wonderful part of their history is that of their penetrating into rocks, and taking up their residence there. When divested of its shell, this animal resembles a roundish soft pudding: it is indeed furnished with two teeth; but they are so situated as to be incapable of touching the hollow surface of its stony dwelling. The instrument with which it performs all its operations, and buries itself in the hardest rocks, is only a broad fleshy substance, resembling a tongue, which is seen issuing from the bottom of the shell. Thus, furnished with the bluntest and softest augre, it effects, by patience and successive applications, what other animals are incapable of performing by force; penetrating the hardest bodies only with its tongue. It begins to make its way into the stone while young and little, by a very narrow entrance; and as it grows bigger, it enlarges its apartments. Here it continues at ease for its life; and the sea-water, which enters at the little aperture, supplies it with luxurious plenty.



NEW, COMPLETE, and UNIVERSAL BODY, or SYSTEM of NATURAL HISTORY;

Being a Grand, Accurate and Extensive
Display of Animated Nature.

B O O K IV.

Containing the Natural History of REPTILES and INSECTS.

C H A P. I.

NATURAL HISTORY of the FROG, the TOAD, the PIPAL, the NATTER JACK, the LIZARD, the CROCODILE, the SALAMANDER, the SCALY LIZARD, the TARAQUINA, the IGUANA, the CAMELEON, the VIPER, the AMMODYTES, the GERENDA, the GI-BOYA, the BOIGUACU, the AMPHISBÆNA, the DEPONA, the RATTLE-SNAKE, the SNAKE, and the BLIND WORM.

NATURAL HISTORY of the FROG.

THE Frog is an animal too well known to require any description; but some of its properties are too singular to be passed by unnoticed. Compared to the bulk of its body, its leap or spring is remarkably great; and it is the best swimmer of all four-footed animals. For these purposes nature has finely adapted the parts of this animal; the arms being light and active, the legs and thighs long, and furnished with very strong muscles. Though it may appear superfluous to describe the form of animals so well known as the Frog and toad, it may be necessary to mark those differences which distinguish them from each other. The Frog moves by leaping; the toad crawls along the ground: the Frog is in general smaller than the toad; it has a brighter colour, and a more polished surface: the toad is brown, rough, and dusky. The Frog is light and nimble, and its belly is small, in proportion to the size of the animal; the toad is slow, corpulent, and heavy. Their internal parts are nearly the same, except that the lungs of the toad are more compact than those of the Frog. Neither has the toad so many air-bladders as the Frog; consequently it is less fitted for living under water.

The Frog has a very little brain for its size; it has a very wide swallow; the stomach is apparently small, but capable of great distention. The heart, like that of all other truly amphibious animals, has but one ventricle; the blood therefore can circulate while it keeps under water, without the assistance of the lungs. The lungs resemble a

number of small bladders joined together, like the cells of the honey-comb: they are connected to the back by muscles, and the animal can distend or exhaust them at pleasure. These are the most striking peculiarities in the anatomy of a Frog; in which it agrees with the toad, the lizard, and the serpent.

The egg which produces a tadpole, is small, black, and globular, and is surrounded with two different kinds of liquor: that which immediately surrounds it, is clear and transparent, and contained in its proper membrane; that which surrounds the whole, is muddy and mucous: the tadpole receives its nourishment from the transparent liquor, in the same manner as young birds are supported by the white of the egg. When this membrane is broken, the tadpole adheres with its mouth to part of it for some time; and as soon as it gets free, sinks to the bottom of the water; whence it never rises while it continues in its tadpole state.

When they are released from their tadpole state, they immediately take to land; and, if the weather has been hot, and some showers fall to refresh the earth, the ground is sometimes seen, for a considerable space, perfectly blackened by myriads of these animalcules, seeking for some secure lurking-places. Hence some have imagined that these animals were generated in the clouds, and thus showered down on the earth. But had they, like our countryman Derham, traced them to the next pool, they would have found a better solution of the difficulty.

The Frog is longer out of the water than in it; but when the cold nights begin to set in, it returns to its native element; always choosing stagnant waters,

waters, where it can lie concealed at the bottom.

Frogs, as well as all other reptiles, feed but a small space of the year. During winter, Frogs and toads remain in a torpid state; the latter of which will dig into the earth, and cover themselves, with almost as much agility as the mole.

Frogs live upon insects of all kinds: they continue motionless till their prey appears, and when it comes sufficiently near, they jump forward with great agility, dart out their tongues and seize it. In this animal, as well as in the toad, lizard, and serpent kinds, the tongue is extremely long, and formed in such a manner, that it swallows the point down its throat. It therefore draws out a length of tongue, like a sword from a scabbard, to assail its prey; and whatever insect touches its tongue, infallibly adheres to it, nature having furnished it with a glutinous substance for that purpose.

The croaking of Frogs is well known, and from thence they are distinguished by the ludicrous title of Dutch nightingales and Boston waits in the fenny countries. The aquatic Frogs of Holland, indeed, are loud beyond conception; and though the animal does not exceed a man's fist in magnitude, it sends forth a note that may be heard at the distance of three miles. The large water Frogs have a note as loud as the bellowing of an ox, and when they exert it, they puff up their cheeks to an amazing size.

Of all Frogs, however, the male only croaks: before wet weather their voices are in full exertion; they are then heard, with unceasing assiduity, sending forth their call, and welcoming the approaches of their favourite moisture. Mr. Pennant informs us, that "There is a time of the year when they become mute, neither croaking, nor opening their mouths for a whole month: this happens in the hot season, and that is in many places known to the country people by the name of the Paddock-moon."

The male Frog is usually of a greyish brown colour: the female is more inclining to yellow, speckled with brown.

When a Frog is ninety-two days old, two small feet are seen towards the tail, and the head appears to be separate from the body. The next day, the legs are considerably enlarged; and four days after that, it refuses all vegetable food; its mouth appears furnished with teeth; and its hinder legs are completely formed: the arms are completely produced in two days more; and the animal is then entirely perfect, except that it still continues to carry the tail: that, however, drops off by degrees, and in the space of a few days, no part of it remains.

With its figure, the Frog also changes its appetites; and, so extraordinary is this transformation, that it immediately rejects the food it greedily fed on a few days before; it would even starve if no other could be procured. When the animal acquires its perfect state, it becomes carnivorous, living entirely upon worms and insects, though before that time it fed entirely upon vegetables. These, however, are not to be found in the water; it is therefore obliged to quit its native element, and hunt after food upon land. At first it is too feeble to endure the warmth of the sun, and therefore conceals itself among bushes, and under stones; but when the earth is refreshed by a shower, they immediately quit their retreats, in order to enjoy the grateful humidity.

We shall conclude our description of the Frog, with an observation of the great Swammerdam, in his book of Nature. "As we see insects lose many parts with their old skin, this is likewise the case in the Frog; which, besides other things, plainly casts off its mouth and tail; so that, however admirable

the art, order, construction, and parts of its members may appear to be; yet the nerves, arteries, veins, cartilages, muscles, and many other remarkable parts, which gradually vanish, and are, as it were, become insensible, are destroyed at once, cease their motions, and stop their several functions, on the change. Are not these changes admirable? And do not they lay before our eyes the omnipotent hand of God, conspicuous in his inaccessible radiancy and infinite majesty? He, in this case, forms another out of one and the same animal, which, though different in appearance, yet remains one and the same creature. May not the *resurrection of the dead* be exemplified in this illustrious instance? all this is very elegantly manifested in various insects."

NATURAL HISTORY of the TOAD.

THE Toad, a well known animal; also called *rubeta*, *rana rubeta*. The Toad is of the frog kind, and of the number of those animals which have only one ventricle in the heart. It resembles the frog, but its belly is more inflated, and skin more full of tubercles: it is of an ash colour, with brown, blackish, and yellow spots. It does not croak like the frog, but makes an indistinct noise that is obscure, and like the word *geu*, or rather *bu*, from which some suppose it is called *bufo*. It is said to have its name *rubeta* from *rubus*, because it is often found under bramble-bushes.

The Toad, says Mr. Pennant, is the most deformed and hideous of all animals; the body broad, the back flat, and covered with a pimply dusky hide; the belly large, swagging, and swelling out, the legs short, and its pace laboured and crawling; its retreat gloomy and filthy: in short, its general appearance is such, as to strike one with disgust and horror; yet we have been told by those who have resolution to view it with attention, that its eyes are fine: to this it seems that Shakespeare alludes, when he makes his Juliet remark,

Some say the lark and loathed Toad change eyes.

As if they would have been better bestowed on so charming a songster than on this raucous reptile.

But the hideous appearance of the Toad is such, as to make this one advantageous feature overlooked, and to have rendered it, in all ages, an object of horror, and the origin of most tremendous inventions. Ælian makes its venom so potent, that, basilisk-like, it conveyed death by its very look and breath; but Juvenal is content with making the Roman ladies, who were weary of their husbands, form a potion from its entrails, in order to get rid of the good man.

To quench the husband's parching thirst, is brought

By the great dame, a most deceitful draught;
In rich Calenian wine she does infuse
(To ease his pain) the Toad's envenom'd juice.

This opinion begat others of a more dreadful nature; for in after-times superstition gave it preternatural powers, and made it a principal ingredient in the incantations of nocturnal hags:

Toad that under the cold stone,
Days and nights has thirty-one,
Swelter'd venom sleeping got,
Boil thou first i'th' charmed pot:

We know by the poet, that this charm was intended for a design of the first consideration, that of raising the dead from their repose, and bringing before the eyes of Macbeth a hateful second sight of the prosperity of Banquo's line.

This

This shews the mighty powers attributed to this animal by the dealers in the magic art; but the powers our poet endues it with, are far superior to those that Gefner ascribes to it: Shakespeare's witches used it to disturb the dead; Gefner's only to still the living.

We may add here another superstition in respect to this animal: it was believed by some old writers, to have a stone in its head, fraught with great virtues, medical and magical: it was distinguished by the name of the reptile, and called the toad-stone, bufonites, crapaudine, krottenstein; but all its fancied powers vanished, on the discovery of its being nothing but the fossil-tooth of the sea-wolf, or of some flat-toothed fish, not unfrequent in our island, as well as in several other countries; but we may well excuse this tale, since Shakespeare has extracted from it a simile of uncommon beauty:

Sweet are the uses of adversity,
Which like the Toad, ugly and venomous,
Wears yet a precious jewel in his head.

But these fables have been long exploded: we shall now return to the notion of its being a poisonous animal; and deliver, as our opinion, that its excessive deformity, joined to the faculty it has of emitting a juice from its pimples, and a dusky liquid from its hind parts, is the foundation of the report.

That it has any noxious qualities, we have been unable to bring proofs in the smallest degree satisfactory, though we have heard many strange relations on that point.

On the contrary, we know several of our friends, who have taken them in their naked hands, and held them long, without receiving the least injury: it is also well known that quacks have eaten them, and have, besides, squeezed their juices into a glass, and drank them with impunity.

We may say also, that these reptiles are a common food to many animals; to buzzards, owls, Norfolk plovers, ducks, and snakes, who would not touch them, were they in any degree noxious.

So far from having venomous qualities, they have of late been considered as if they had beneficent ones. We wish, for the benefit of mankind, that we could make a favourable report of the many attempts of late to cure the most terrible of diseases, the cancer, by the application of live toads; but alas, they seem only to have rendered a horrible complaint more loathsome.

In a word, we may consider the Toad as an animal that has neither good nor harm in it; that being a defenceless creature, nature has furnished it, instead of arms, with a most disgusting deformity, that strikes into almost every being capable of annoying it, a strong repugnancy to meddle with so hideous and threatening an appearance.

The time of their propagation is very early in the spring: at that season the females are seen crawling about oppressed by the males, who continue on them for some hours, and adhere so fast, as to tear the very skin from the parts they stick to. We are uncertain whether they are viviparous: Linnæus says they are, and diverts us with a report he had heard, that the male acts the midwife to the female in parturition.

To conclude this account with the marvellous, this animal is said to have often been found in the midst of solid rocks, and even in the centre of growing trees, imprisoned in a small hollow, to which there was not the least adit or entrance: how the animal breathed, or how it subsisted (supposing the possibility of its confinement) is past our comprehension. Plot's solution of this phenomenon is far from satisfactory; yet as we have the great Bacon's

authority for the fact, we do not entirely deny our assent to it. *British Zoology*, vol. iii. p. 7.

There is a very poisonous species in America, called cururu by the Brafilians, and capo by the Portuguese.

The common Toad was first introduced into medicine upon a cure being performed on an hydroptic person, to whom powdered Toads were given, in order to dispatch him, but he voided a large quantity of urine after taking it, and soon recovered of his disorder. Since this, Toads, gently dried and powdered, have been used as a diuretic; but the present practice is quite unconcerned with them.

In the cure of a cancer, says Etmuller, and more particularly unexulcerated cancers in the breasts of women, Toads are of singular service, either calcined alone, or dried to such a degree, that they may be reduced to a powder. The method of applying this powder, is to sprinkle it on the part affected. This powder may also be mixed with orpiment and foot, and applied, when spread, upon a pledget moistened with saliva. We are also told, that many patients labouring under epidemical dysenteries, have been happily recovered by the use of this powder, which operates as a sudorific. Some prescribe half a dram of it, and upwards, in the small-pox. D. Carlius recommends the powder of calcined Toads, mixed with the powder of blue linen cloth burnt, in epilepsies of adult persons, attended with an inspissation of the juices; and affirms, that as much of it as may be taken at twice upon the point of a small knife, has in some epileptic patients produced the most happy and surprizing effects. He also informs us that a dose from ten to twenty grains of the powder of calcined Toads, exhibited internally, wonderfully mitigates arthritic pains, and more especially those with which wounds are attended.

We have an account of two boys, who towards the latter end of a pestilential disorder, in which they had been long afflicted with carbuncles, together with an universal anasarca and dropsy, were cured by a plentiful diuresis excited by the powder of Toads, mixed with salt of wormwood, daily exhibited.

The diaphoretic virtue of this powder, by which it must of course contribute to the cure of a dropsy, was accidentally discovered, as Boecler from Solenander informs us in the following history. At Rome a certain man had the misfortune to be afflicted with a dropsy, and his wife, thinking much of the expences attending his cure, maliciously resolved to poison him; for which purpose she gave him a dose of the powder of a Toad, calcined in an earthen vessel, by which means a very plentiful discharge of urine was occasioned. But the wife, heartily wearied of so useless and expensive a husband, was exceedingly desirous to put an end to his miserable life by a sudden death. With this view, she exhibited the same powder a second time, by which means the waters were plentifully discharged by urine, and the patient cured. Thus her views were disappointed, and what was intended for a poison, happily proved a noble and efficacious medicine.

The following remarkable particulars were communicated in a letter from J. Arscott, Esq; of Tabbott, in Devonshire, to Mr. Pennant. "It would give me, says he, the greatest pleasure to be able to inform you of any particulars concerning the Toad who lived for many years with us, and was so great a favourite. The greatest curiosity in it, was its becoming so remarkably tame. It had frequented some steps before the hall door, some years before my acquaintance commenced with it, and had been admired by my father for its size (which was of the largest

largest I ever met with) who constantly paid it a visit every evening. I knew it myself above thirty years, and by constantly feeding it, brought it to be so tame, that it always came to the candle, and looked up, as if expecting to be taken up and brought upon the table, where I always fed it with insects of all sorts: it was fondest of flesh maggots, which I kept in bran; it would follow them, and when within a proper distance, would fix its eye, and remain motionless for near a quarter of a minute, as if preparing for the stroke, which was an instantaneous throwing its tongue at a great distance upon the insect, which stuck to the tip by a glutinous matter: the motion is quicker than the eye can follow.

"I always imagined that the root of its tongue was placed in the fore part of its under jaw, and the tip towards its throat, by which the motion must be a half circle; by which, when its tongue recovered its situation, the insect at the tip would be brought to the place of deglutition. I was confirmed in this, by never observing any internal motion in its mouth, excepting one swallow, the instant its tongue returned. Possibly I might be mistaken, for I never dissected one, but contented myself with opening its mouth, and slightly inspecting it.

"You may imagine that a Toad, generally detested (although one of the most inoffensive of all animals) so much taken notice of and befriended, excited the curiosity of all comers to the house, who all desired to see it fed; so that even ladies so far conquered the horrors instilled into them by nurses, as to desire to see it. This produced innumerable and improbable reports, making it as large as the crown of a hat, &c. &c. This I hope will account for my not giving you particulars more worth your notice. When I first read the account in the papers of Toads sucking cancerous breasts, I did not believe a word of it, not thinking it possible for them to suck, having no lips to embrace the part, and a tongue so oddly formed; but as the fact is thoroughly verified, I most impatiently long to be fully informed of all particulars relating to it."

Mr. Arscott, in a second letter to the same gentleman, mentions among others, the following additional particulars, in answer to some queries proposed by him. "I cannot say how long my father had been acquainted with the Toad, before I knew it; but when I first was acquainted with it, he used to mention it as the old Toad I've known so many years; I can answer for thirty-six years.

"No Toads that ever I saw appeared in the winter season. The old Toad made its appearance as soon as the warm weather came, and I always concluded it retired to some dry bank to repose till the spring. When we new-laid the steps, I had two holes made in the third step on each, with a hollow of more than a yard long for it, in which I imagine it slept, as it came from thence at its first appearance.

"It was seldom provoked: neither that Toad (nor the multitudes I have seen tormented with great cruelty) ever shewed the least desire of revenge, by spitting or emitting any juice from their pimples.

"A Toad has no particular enmity for the spider.

"I hardly remember any persons taking it up, except my father and myself: I do not know whether it had any particular attachment to us.

"In respect to its end, I answer this last query. Had it not been for a tame raven, I make no doubt but it would have been now living; who one day seeing it at the mouth of its hole, pulled it out, and, although I rescued it, pulled out one eye, and hurt it so, that notwithstanding its living a twelve-month, it never enjoyed itself, and had a difficulty

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of taking its food, missing the mark for want of its eye. Before that accident, it had all the appearance of perfect health."

It is said, that cancerous complaints may be cured by a Toad. It is, however, certain, great relief has been obtained by that animal's sucking a cancerous breast. The whole of the animal, except its head, is put into a linen bag, and the head is held to the part. It generally seizes the foulest part of the sore in an instant, and sucks with greediness, till it drops off dead. It frequently happens, that the creature swells immensely. Some have lived above a quarter of an hour after sucking; others much longer. Some have been known to suck upwards of four hours, and then dropped dead from the wound, swelled exceedingly, and turned of a pale colour. During the time of their sucking, they are heard to smack their lips like a young child.

NATURAL HISTORY of the PIPAL, or SURINAM TOAD.

THE form of this animal is even more hideous than that of the common Toad: the body is flat and broad; the head small; the skin of the neck forms a kind of wrinkled collar; the colour of the head is of a dark chestnut; and the eyes are small: the back is of a lightish grey, and seems covered with a number of small round eyes, placed at nearly equal distances. These eyes are very different from what they seem; for they are the animal's eggs, covered with their shells, and placed there for hatching. These eggs are buried deep in the skin, and hardly appear in the beginning of incubation; but they are very visible when the young animal is about to burst from its confinement. Their colour is a yellowish red, and the spaces between them are full of small warts, resembling pearls. In all nature, there is not perhaps a more extraordinary phenomenon, than that of an animal breeding and hatching its young in its back; from whence, when arrived at maturity, they crawl out one after the other. This animal, like the rest of the frog kind, is most probably harmless; though we are told of terrible effects resulting from its powder when calcined.

NATURAL HISTORY of the NATTER JACK.

THIS animal neither leaps, nor crawls with the slow pace of the toad, but its motion rather resembles running. The upper part of the body is of a dirty yellow, clouded with brown: it is covered with porous pimples of unequal sizes. The Natter Jack has a yellow line on the back: it has four divided toes on the fore feet, and five on the hind feet a little webbed. It frequents dry and sandy places.

OF LIZARDS in General.

IT is difficult to say to what class in nature Lizards are chiefly allied. They cannot properly be raised to the rank of beasts as they bring forth eggs, dispense with breathing, and are not clothed with hair. They cannot be ranked with fishes, as the majority of them live upon land: their feet, upon which they run with great celerity, exclude them from the serpent tribe; and they cannot be placed among insects, on account of their size. But, tho' the Lizard is in some measure excluded from every rank, it exhibits somewhat of the properties of all: it has the legs and celerity of the quadruped; the facility of creeping through narrow and intricate ways,

ways, like the serpent; and the power of living in the water like the fish.

Lizards not only differ from every other class of animals, but they also differ widely from each other: with respect to size, no class of beings has its ranks so opposite. What can be more removed than the small camoleon of an inch long, and the alligator above twenty-seven feet. Their colour is also very various: they are found of a green, blue, red, chestnut, yellow, spotted, streaked, and marbled. If colour alone could constitute beauty, the Lizard would often please; but there is something so repressing in its figure, that the brilliancy of its scales, or the variety of its spots, cannot make it a desirable object to behold.

But animals of the Lizard kind, are principally distinguished by the manner of bringing forth their young. The crocodile, the iguana, and all the larger kinds, bring forth eggs, which are hatched by the heat of the sun: their produce are complete upon leaving the shell; and their first efforts are to run to seek food in their proper element. The viviparous kinds, in which are all the salamanders, are produced alive by the female, perfect and active, and suffer no succeeding change. But those which are bred in the water, suffer a very considerable change in their form. They are produced with an external skin or covering, which sometimes encloses their feet, and gives them a serpentine appearance. Above and below their tail, fins are added to this false skin, that serve the animal for swimming; these, and the false skin, drop off together; and the lizard has four feet, is completely formed, and forsakes the water.

The three kinds, however, have many points of similitude: they have all four short legs: they have tails which are thick at the beginning, and run tapering to a point: they are all amphibious, and equally capable of living upon land and in the water; and they are all formed internally in the same manner as the tortoise, and other animals that can continue a long time without respiration.

NATURAL HISTORY of the CROCODILE.

THIS animal is placed at a happy distance from the inhabitants of Europe. To look for the Crocodile in all its natural terrors, grown to an enormous size, and committing unceasing devastations, we must go to the uninhabited regions of Africa, and America. In the river Amazons, or the river Niger, they are found from eighteen to twenty-seven feet in length; and sometimes lying as close to each other, as a raft of timber in the Thames.

Of this animal there are two kinds; the Crocodile, properly so called, and the cayman or alligator. Travellers, however, have rather made the distinction than nature; for in the general outline, and in the nature of these two animals, they are entirely the same. It would be speaking more properly to call these animals, the Crocodiles of the eastern and the western world; for in books of voyages, they are so entirely confounded together, that there is no knowing whether the Asiatic animal be the Crocodile of Asia, or the alligator of the western world. The usual distinctions between the Crocodile and alligator are these: the body of the Crocodile is more slender than that of the alligator; its snout runs off tapering from the forehead, like that of a greyhound; while that of the other is indented like the nose of a lap-dog. The Crocodile has a much wider swallow, and is of an ash colour; the alligator is black, varied with white, and is said to be less mischievous.

The Crocodile grows to a great length, some-

times exceeding thirty feet long, from the tip of the snout to the end of the tail: its most usual length, however, is eighteen. They are seen in some places lying for whole hours, and even days stretched in the sun and motionless; so that a person unacquainted with the sight, might mistake them for trunks of trees, covered with a rough and dry bark; but the mistake would soon be fatal, if not prevented: for the torpid animal at the near approach of any living thing, darts upon it with instant swiftness, and at once drags it down to the bottom. In the times of an inundation they sometimes enter the cottages of the natives, where the dreadful visitant seizes the first animal it meets with. There have been several examples of their taking a man out of a canoe in the sight of his companions, without their being able to afford him the least assistance.

Every part of the Crocodile is remarkably strong; and its arms both offensive and defensive are irresistible. We have seen, from the shortness of its legs, the amazing strength of the tortoise: but how insignificant is the strength of such an animal, compared to that of the Crocodile, whose legs are very short, and whose size is so superior? The backbone is jointed in the firmest manner; the muscles of the fore and hinder legs are vigorous and strong; and its whole form finely calculated for force. Its teeth are sharp, numerous, and formidable; its claws are long and tenacious; but its principal instrument of destruction is the tail; with a single blow of which it has frequently overturned a canoe, and seized upon the poor savage who was the conductor of it.

Though less powerful upon land, the Crocodile is terrible even there. It seldom leaves the water, except when pressed by hunger, or with a view of depositing its eggs. It usually floats along upon the surface, and seizes whatever animals come within its reach; but when this method fails, it then goes nearer to the bank. Disappointed of its fishy prey, it there waits covered up among the sedges, in patient expectation of some land animal that comes to drink; the dog, the bull, the tiger, or man himself. Nothing is to be seen of the insidious destroyer as the animal approaches; nor is its retreat discovered till it be too late to escape its fury. It seizes the victim with a spring, and goes at a bound much faster than so unweildy an animal could be thought capable of exerting; then having secured the creature with both teeth and claws, it drags it into the water, sinks with it to the bottom, and drowns it in an instant.

The animal which the Crocodile has thus surprised, sometimes, indeed, escapes from its grasp, wounded, and makes off from the river-side. The tyrant, however, pursues with all its force, and often seizes it a second time. Thus it is frequently seen above half a mile from the bank, in pursuit of some animal, which it has wounded beyond the power of escaping, and then dragging it back to the shore, where it feasts in security.

In its depredations along the bank, the Crocodile sometimes seizes on a creature as formidable as itself, and meets with a most desperate resistance. Frequent combats happen between the Crocodile and the tiger. Creatures of the tiger kind are continually oppressed by a parching thirst, which keeps them always in the vicinity of great rivers, whither they descend to drink very frequently. Upon these occasions they are seized by the Crocodile; and they die not unrevenged. The instant they are seized upon, they turn with the greatest agility, and force their claws into the Crocodile's eyes, while he plunges with his fierce antagonist into the river. There they continue to struggle for some time, till at last the tiger is drowned.

The Crocodile thus seizes and destroys every animal, and is equally dreaded by all. Man alone can combat it with success. Labat assures us, that a negro, with no other weapons than a knife in his right hand, and his left arm wrapped round with a cow's hide, ventures boldly to attack this animal in its own element. As soon as he approaches the Crocodile, he presents his left arm, which the animal most greedily swallows; but sticking in its throat, the negro has time to give it several stabs under the throat; and the water also getting in it at the mouth, which is held involuntarily open, the creature soon becomes swelled as large as a tun, and expires.

To those who live at a distance from the rapacity of these animals, these stories appear strange and romantic. From not having seen any thing so formidable in the circle of their own experience, they should not, however, determine upon the wonderful transactions in distant climates. It is probable that these, and many other dreadful encounters, happen every day among those forests and in those rivers, where the most formidable animals are known to reside; where the elephant and the rhinoceros, the tiger and hippopotame, the shark and the Crocodile, have frequent opportunities of meeting, and renewing their engagements.

Crocodiles are taken by the Siamese in great abundance. The natives of that empire are particularly fond of the capture of all the great animals with which their country abounds. The manner of taking the Crocodile in Siam, is by throwing three or four strong nets across a river, at proper distances from each other; so that if the animal breaks through the first, it may be caught by one of the rest. When it is first taken, it employs the tail with great force; but after many unsuccessful struggles, the animal's strength becomes exhausted. Then the natives approach their prisoner in boats, and pierce him with their weapons in the most tender parts till he is weakened with the loss of blood. When he has done stirring, they begin by tying up his mouth, and with the same cord they fasten his head to his tail, which last they bend back like a bow. However, they are not yet perfectly secure from his fury; but, for their greater safety, they tie his fore-feet, as well as those behind, to the top of his back. These precautions are not useless; for if they were to omit them, the Crocodile would soon recover strength enough to do considerable mischief.

The Crocodile thus brought into subjection, or bred up young, is used to divert and entertain the great men of the East. It is often managed like an horse; a curb is put into its mouth, and the rider directs it as he thinks proper. Though awkwardly formed, it proceeds with some degree of swiftness; and is thought to move as fast as some of the most unweildy of our own animals, the hog or the cow. Some, indeed, assert that no animal could escape it, but for its difficulty in turning; but to this resource we could wish none would trust, who are so unhappy as to find themselves in danger.

In the rivers of Africa the Crocodile is sometimes taken in the same manner as the shark. Several Europeans go together in a large boat, and throw out a piece of beef upon a hook and strong fortified line, which the Crocodile seizing and swallowing, is drawn along, floundering and struggling till its strength is quite exhausted, when it is pierced in the belly, which is its tenderest part; and thus after numberless wounds is drawn ashore. In this part of the world also, as well as at Siam, this animal makes an object of savage pomp near the palaces of their monarchs. Philips informs us, that at Sabi, on the slave coast, there are two pools of wa-

ter near the royal palace, where Crocodiles are bred as we breed carp in our European ponds.

Hitherto we have described the Crocodile as it is found in unpeopled countries, and undisturbed by frequent encounters with mankind. In this state it is fierce and cruel, attacking every object that seems endued with motion: but in Egypt, and other countries long peopled, where the inhabitants are civilized and the rivers frequented, this animal is solitary and timid. Instead of coming to attack a man, it sinks at his approach with the utmost precipitation; and, as if sensible of superior power, ever declines the engagement. We have many instances, in animated nature, of the contempt which at first the lower orders of the creation have for man, till they have experienced his powers of destruction. The lion and the tiger among beasts, the whale among fishes, the albatross and the penguin among birds, meet the first encounters of man without dread or apprehension; but they soon learn to acknowledge his superiority; and take refuge from his power in the deepest recesses of nature. This may account for the different characters which have been given us of the Crocodile and the alligator by travellers at different times: some describing them as harmless and fearful, as ever avoiding the sight of a man, and preying only upon fishes; others ranking them among the destroyers of nature; describing them as furnished with strength, and impelled by malignity to do mischief; representing them as the greatest enemies of mankind, and particularly desirous of human prey. The truth is, the animal has been justly described by both; being such as it is found in places, differently peopled or differently civilized. Wherever the Crocodile has reigned long unmolested, it is fierce, bold, and dangerous; wherever it has been harrassed by mankind, its retreats invaded, and its numbers destroyed, it is there timorous and inoffensive.

Instead of being formidable, this animal in some places is not only inoffensive, but is cherished and admired. In the river San Domingo, the Crocodiles are the most inoffensive animals in nature; the children play with them, ride about on their backs, and even beat them sometimes without receiving the smallest injury. The inhabitants indeed are very careful of this gentle breed, and consider them as harmless domestics.

It is perhaps the smell of musk, which all these animals exhale, that renders them agreeable to the savages of that part of Africa. They are often known to take the part of this animal which contains the musk, and wear it as a perfume about their persons. Travellers are not agreed in what part of the body these musk-bags are contained; some say in the ears; some, in the parts of generation; but the most probable opinion is, that this musky substance is amassed in glands under the legs and arms. From whatsoever part of the body this odour proceeds, it is very strong and powerful, tincturing the flesh of the whole body with its taste and smell. This animal's flesh is at best very indifferent eating; but unless the musk-bags be separated it is insupportable. The negroes themselves cannot well digest the flesh; but they consider a Crocodile's egg as the most delicate morsel in the universe.

Crocodiles always breed near fresh waters; and though they are sometimes found in the sea, yet that may be considered rather as a place of excursion than abode. They produce their young by eggs; for which purpose the female, when she comes to lay, chuses a place by the side of a river, or some fresh-water lake, to deposit her brood in. She always pitches upon an extensive sandy shore. The shore must also be gentle and shelving to the water, for

for the greater convenience of the animal's going and returning; and a convenient place must be found near the edge of the stream, that the young may have a shorter way to go. When all these requisites are adjusted, the animal is seen cautiously stealing up on shore to deposit her burden. The presence of a man, a beast, or even a bird, is sufficient to deter her at that time; and if she perceives any creature looking on, she infallibly returns. But if nothing appears, she begins scratching up the sand with her fore paws, and making a deep hole in the shore. There she deposits from eighty to an hundred eggs, of the size of a tennis-ball, and of the same figure, enclosed in a tough white skin like parchment. She takes above an hour to perform this task; and then covering up the place so artfully that it can scarcely be perceived, she goes back to return again the next day. On her return, she lays about the same number of eggs; and as many the day following. Thus having deposited her whole quantity, and having covered them close up in the sand, they are soon vivified by the heat of the sun; and at the end of thirty days, the young ones begin to break open the shell. The female is then instinctively taught that her young ones require relief; she therefore goes up on land to scratch away the sand, and set them at liberty. They soon avail themselves of their liberty; a part run unguided to the water; and another part ascend the back of the female, and are carried thither in greater safety. But the moment they arrive at the water, all natural connection ceases: when the female has introduced her young to their natural element, she and the male become among the number of their most formidable enemies, and devour as many of them as they can. The whole brood scatters into different parts at the bottom; and by far the greatest number are destroyed.

It is not the Crocodile alone, however, that is thus found to thin their numbers; the eggs of this animal are not only a delicious feast to the savage, but are eagerly sought after by every beast and bird of prey. The ichneumon was erected into a deity among the ancients, for its success in destroying the eggs of these monsters: at present that species of the vulture called the gallinazo is their most prevailing enemy. All along the banks of great rivers, for thousands of miles, the Crocodile is seen to propagate in numbers that would soon over-run the earth, but for the vulture, which seems appointed by Providence to abridge its fecundity. These birds are ever found in greatest numbers where the Crocodile is most numerous; and hiding themselves within the thick branches of the trees that shade the banks of the river, they silently watch the female, and permit her to lay all her eggs without interruption. When she has retired, they encourage each other with cries to the spoil; and flocking together upon the hidden treasure, tear up the eggs, and devour them in less time than they were deposited. They are equally diligent in attending the female while she is carrying her young to the water; for if any one of them happens to drop by the way, it is sure to receive no mercy.

To what age the Crocodile lives we are not certainly informed; Aristotle says, it lives the age of man: but the ancients so much amused themselves in inventing fables concerning this animal, that even truth from them is suspicious. What we know for certain from the ancients is, that among the various animals that were produced to fight in the amphitheatre at Rome, the combat of the Crocodile was not wanting. Marcus Scaurus produced them living in his unrivalled exhibitions; and the Romans considered him as the best citizen, because he furnished them with the most expensive entertainments,

NATURAL HISTORY of the SALAMANDER.

As the ancients saw the earth, the air, and water inhabited, fancy was set to work to form an inhabitant of fire; and thus to people every part of nature. They have described a lizard that is bred from heat, that lives in the flames, and feeds upon fire as its proper nourishment. It is universally known, however, that there is no such animal existing.

The modern Salamander, as already observed, is an animal of the lizard kind, and a large tribe is comprehended under this name. Seven sorts of Salamanders have been described by Seba; and if we suppose the tail of a lizard applied to the body of a frog, we shall form a tolerable idea of their figure. The common lizard is long, small, and taper; the Salamander, like the frog, has its eyes towards the back of the head; but it differs more from the lizard tribe in its nature and conformation than in its figure. The Salamander is an heavy torpid animal; the lizard tribe are active, restless, and ever in motion.

The Salamander, and many others of the lizard tribe, are said to have venom; but it is certain that all with which we are acquainted in this country, are perfectly harmless; and it is equally true, that, for a long time, till our prejudices were removed, we considered not only the newt, but the snake and the blind-worm, as fraught with the most destructive poison. At present we have got over these prejudices; and, it is probable, that, if other nations made the same efforts for information, it would be found, that the malignity of most, if not all, of the lizard tribe, was only in the imagination.

The whole tribe of Salamanders, from the moron to the gekko, are said to be venomous to the last degree; yet, when experiments have been tried, no arts, no provocations, could excite these animals to the rage of biting. They seem timid and inoffensive, feeding only upon worms and insects; quite destitute of fangs, like the viper; their teeth are so very small, that they are hardly able to inflict a wound. But as the teeth are thus incapable of offending, the people of the countries where they are found have recourse to a venomous slaver, which, they suppose, issues from the animal's mouth; they also tell us of a venom issuing from the claws: even Linnæus seems to acknowledge the fact; but thinks it a probable supposition, that this venom may proceed from their urine.

The gekko is the most notorious for its powers of mischief: yet, we are told by those who load it with that calumny, that it is very friendly to man, and though supplied with the most deadly virulence, is yet never known to bite. It would be absurd in us, without experience, to pronounce upon the noxious or inoffensive qualities of animals: yet it is most probable, from an inspection of the teeth of lizards, and from their inoffensive qualities in Europe, that the gekko has been unjustly accused; and that its serpent-like figure has involved it in one common reproach with serpents.

The Salamander best known in Europe, is from eight to eleven inches long, usually black, spotted with yellow; and when taken in the hand feeling extremely cold. There are several kinds. Our black water newt is reckoned among the number. The idle report of its being incombustible in fire, has caused many of these poor animals to be burnt; but we cannot say as philosophical martyrs; since scarce any philosopher could think it necessary to make the experiment. When thrown into the fire, the animal is seen to burst with the heat of its situation, and to eject its fluids. We are gravely told, in the Philosophical Transactions, that this

is a method the animal takes to extinguish the flames.

The Salamander differs very little internally from other animals of the lizard kind. It is furnished with lungs that sometimes serve for the offices of breathing; with a heart that has its communications open, so that the animal cannot easily be drowned. But what deserves particular notice is the manner of this animal's bringing forth its young alive. "The Salamander begins to show itself in spring, and chiefly during heavy rains. When the warm weather returns, it disappears; and never leaves its hole, during either great heats or severe colds, both which it equally fears. When taken in the hand, it appears like a lump of ice; it consequently loves the shade, and is found at the feet of old trees, surrounded with brush-wood at the bottom. It is fond of running along new-ploughed grounds; probably to seek for worms, which are its usual food. One of these," says our author, "I took alive some years ago in a ditch that had been lately made. I laid it at the foot of the stairs upon coming home, and there it disgorged from the throat a *worm* three inches long, that lived for an hour after, though wounded as I suppose by the teeth of the animal. I afterwards cut up another of these lizards, and saw not less than fifty young ones, resembling the parent, come from its womb, all alive, and actively running about the room." It were to be wished the author had used another word beside that of *worm*; as we now are in doubt whether he means a real worm, or a young animal of the lizard species: had he been more explicit, and had it appeared that it was a real young lizard, which we take to be his meaning, we might here see a wonder of nature, brought to the proof which many have asserted, and many have denied. We mean the refuge which the young of the shark, the lizard, and the viper kinds, are said to take, by running down the throat of the parent, and there finding a temporary security. The fact, indeed, seems a little extraordinary; and yet it is so frequently attested by some, and even believed by others, whose authority is respectable, among the number of whom we find Mr. Pennant, that the argument of strangeness must give way to the weight of authority.

There is no doubt, however, of the animal's being viviparous, and producing above fifty at a time. They are produced in full perfection, and quickly leave the parent to shift for themselves. These animals, in the lower ranks of nature, want scarce any help when excluded; they soon complete the little circle of their education; and in a day or two are capable of practising all the arts of subsistence and evasion practised by their kind.

They are all amphibious, or at least are found capable of subsisting in either element, when placed there; if those taken from land are put into water, they continue there in seeming health; and, on the contrary, those taken from the water will live upon land. In water, however, they exhibit a greater variety in their appearance; and what is equally wonderful with the rest of their history, during the whole spring and summer this water lizard changes its skin every fourth or fifth day; and during the winter every fifteen days. This operation they perform by means of the mouth and the claws; and it seems a work of no small difficulty and pain. The cast skins are frequently seen floating on the surface of the water; they are sometimes seen also with part of their old skin still sticking to one of their limbs, which they have not been able to get rid of. This also often corrupts, and the leg drops off; but the animal does not seem to feel the want of it, for the loss of a limb to all the lizard kind is but a trifling calamity. They can live several hours even after the loss of their head: and for some time,

under dissection, all the parts of this animal seem to retain life; but the tail is the part that longest retains its motion. Salt seems to be much more efficacious in destroying these animals, than the knife; for, upon being sprinkled with it, the whole body emits a viscous liquor, and the lizard dies in a few minutes, in great agonies.

The lizard kind are also tenacious of life in another respect, and the Salamander among the number. They sustain the want of food in a surprising manner. One of them, brought from the Indies, lived nine months, without any other food than what it received from licking a piece of earth on which it was brought over: another was kept by Seba in an empty vial for six months, without any nourishment; and Redi talks of a large one, brought from Africa, that lived eight months without taking any nourishment whatever. Indeed, as many of this kind, both Salamanders and lizards, are torpid, or nearly so, during the winter, the loss of their appetite for so long a time is the less surprising.

NATURAL HISTORY of the SCALY LIZARD.

THE length of this animal, from the nose to the hind legs, is about three inches; and from thence to the end of the tail, three inches and three quarters. It has a black list along the back, and a brown one on each side; beneath that it has a broad black one. The belly is yellow, and the scales large and even. The scales on the back are small, varied with black and brown. The legs and feet are dusky, each foot having five toes furnished with claws. This species is extremely nimble: in hot weather it is frequently seen basking on the sides of dry banks or old trees; but, on being observed, it immediately retreats to its hole. The food of this and every other species of English Lizards, is insects. All the Lizards of this country are perfectly harmless; it is their form only that disgusts us, and has occasioned them to be represented in an unfavourable light.

The WARTY LIZARD.

This animal is six inches and an half in length, of which the tail is about three inches and a quarter. The iris of the eye is yellow. The head and part of the back is flat, of a dark dusky colour, and covered with small pimples or warts: the sides are covered with white warts: the belly is of a bright yellow, spotted with black. The fore-feet are divided into four toes; the hind feet with five; they are all dusky, spotted with yellow, and without nails. The pace of this Lizard is slow and crawling.

The GREEN LIZARD.

The Green Lizard is so called from its colour, and it is larger than the common sort. It delights in warm countries, and is very common in Italy. They are found on trees in the summer-time, where they make a noise like the croaking of frogs.

The BROWN LIZARD.

This species is about three inches long; the body is slender; the tail long, small and taper. The upper part of the body is of a pale brown, marked on each side of the back with a narrow black line, extending to the end of the tail. The belly is of a pale yellow, marked with small dusky spots.

There is a species called the snake-shaped Lizard, which seems to be of that kind which connects the serpent and Lizard genus, having a long slender body, and very small legs.

The TARANTALA LIZARD.

This animal is very common near Naples and Rome: it has a rough skin of an ash colour, and is thicker and more fleshy than other Lizards. It usually haunts the ruins of old buildings, and walls; and has a very disagreeable aspect, striking the beholders with a kind of dread. When Mr. Ray first saw one, he says he shuddered as it were by instinct. It is however said, that it is perfectly harmless, and the horror with which it affects mankind, is principally owing to its ugliness and filthy aspect.

NATURAL HISTORY of the TARAQUINA.

THIS animal, which is a Brazilian Lizard, is about a foot in length. The body is round, and covered with triangular ash coloured scales. It delights in gardens, and to be near houses: when it sees any thing, it nods the head in a very surprising manner; and runs nimbly from place to place, making strange motions with its body. It is said, that when this animal sees a man sleeping, and a serpent, or any other venomous animal coming near him, it never fails to wake him that he may avoid the danger.

The Ameiva, which is a Lizard of South America, is in all respects like the former, except that it has a forked tail.

NATURAL HISTORY of the IGUANA.

THE length of this animal is about five feet, and the body is about as thick as a man's thigh: the skin is covered with small scales, like those of a serpent; and the back is furnished with a row of prickles, that stand up, like the teeth of a saw: the eyes seem to be but half opened, except when the animal is angry, and then they appear large and sparkling: both the jaws are full of very sharp teeth, and the bite is dangerous though not venomous, for it never quits its hold till it is killed. The male has a skin hanging under his throat, which reaches down to his breast; and, when displeased, he puffs it up like a bladder: he is one third larger and stronger than the female; tho' the strength of either avails them little towards their defence. The males are ash coloured, and the females green.

The flesh of the Iguana may be considered as the greatest delicacy of Africa and America; and the sportsmen of those climates go out to hunt it as we do in pursuit of the pheasant or the hare. In the beginning of the season, when the great floods of the tropical climates are past away, and vegetation starts into universal verdure, the sportsmen are seen, with a noose and a stick, wandering along the sides of the rivers, to take the Iguana. This animal, though apparently formed for combat, is the most harmless creature of all the forest; it lives among the trees, or sports in the water, without ever offering to offend; there, having fed upon the flowers of the mahot, and the leaves of the mapou, that grow along the banks of the streams, it reposes upon the branches of the trees that hang over the water. Upon land the animal is swift of foot; but when once in possession of a tree, it seems conscious of the security of its situation, and never offers to stir. There the sportsman easily finds it, and as easily fastens his noose round its neck: if the head be placed in such a manner that the noose cannot readily be fastened, by hitting the animal a blow on the nose with the stick, it lifts the head, and offers it in some measure to the noose. In this manner, and also by the tail, the Iguana is dragged

from the trees, and killed by repeated blows on the head.

NATURAL HISTORY of the CAMELEON.

THIS little animal, like the crocodile, proceeds from an egg; and it also nearly resembles that formidable creature in form; but it differs considerably in its size and its appetites; it is not above eleven inches long, and delights to sit upon trees, being afraid of serpents, from which it is unable to escape on the ground. The head of a large Cameleon is almost two inches long; and from thence to the beginning of the tail, four and an half; the tail is five inches long, and the feet two and an half; the thickness of the body is different at different times; for sometimes, from the back to the belly, it is two inches, and sometimes but one; for it can blow itself up, and contract itself, at pleasure. This swelling and contraction is not only of the back and belly, but of the legs and tail.

These tumours do not proceed from a dilatation of the breast in breathing, which rises and falls by turns, but are very irregular, and seem adopted merely from caprice. The Cameleon is often seen, as it were, blown up for two hours together; and then it continues growing less and less insensibly; for the dilatation is always quicker and more visible than the contraction. In the contracted state, the animal appears extremely lean; the spine of the back seems sharp, and all the ribs may be numbered, the tendons of the legs and arms may also be seen very distinctly.

This method of puffing itself up is similar to that in pigeons, whose crops are sometimes greatly distended with air. The Cameleon has a power of driving the air it breathes over every part of the body, but it only gets between the skin and the muscles; for the muscles themselves are never swollen. The skin is very cold to the touch: and tho' the animal seems so lean, there is no feeling the beating of the heart. The surface of the skin is unequal, and has a grain not unlike shagreen, but very soft; because each eminence is as smooth as if it were polished. Some of these little protuberances are as large as a pin's head, on the arms, legs, belly and tail; but on the shoulders and head they are of an oval figure, and a little larger: those under the throat are ranged in the form of a chaplet, from the lower lip to the breast. The colour of all these eminences, when the Cameleon is at rest in a shady place, is of a bluish grey; and the spaces between are of a pale red and yellow.

But the wonderful part of this animal's history, is when it is removed into the sun. At first it appears to suffer no change of colour, its greyish spots still continuing the same; but the whole surface soon appears to imbibe the rays of light; and the simple colouring of the body changes into a variety of beautiful hues. Wherever the light comes upon the body, it is of a tawny brown; but that part of the skin on which the sun does not shine, changes into several brighter colours, pale yellow, or vivid crimson; which form spots of half the size of a man's finger; some of these descend from the spine half way down the back; and others appear on the sides, arms, and tail. When the sun ceases to shine, the original grey colour returns by degrees, and covers all the body. Sometimes the animal becomes all over spotted with brown spots, of a greenish cast. When wrapped up in a white linen cloth for two or three minutes, the natural colour becomes much lighter; but not quite white, as some authors have pretended: however, from hence it must not be concluded, that the Cameleon assumes the colour of the objects which it approaches; this

S E R P E N T S .

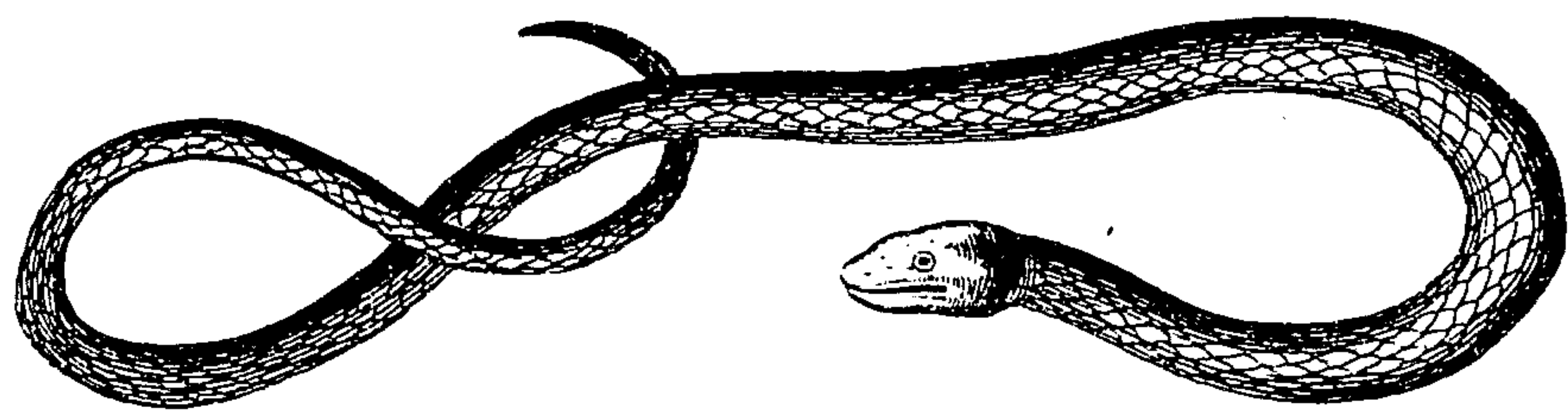
AMERICIMA or Brazilian Lizard



ASP



BOYUNA



CAMELEON



LACERTA Squamosa



LACERTA Chalcidica or SEPS



Lacerta Palustris

SALAMANDRA aquatica or warty Lizard



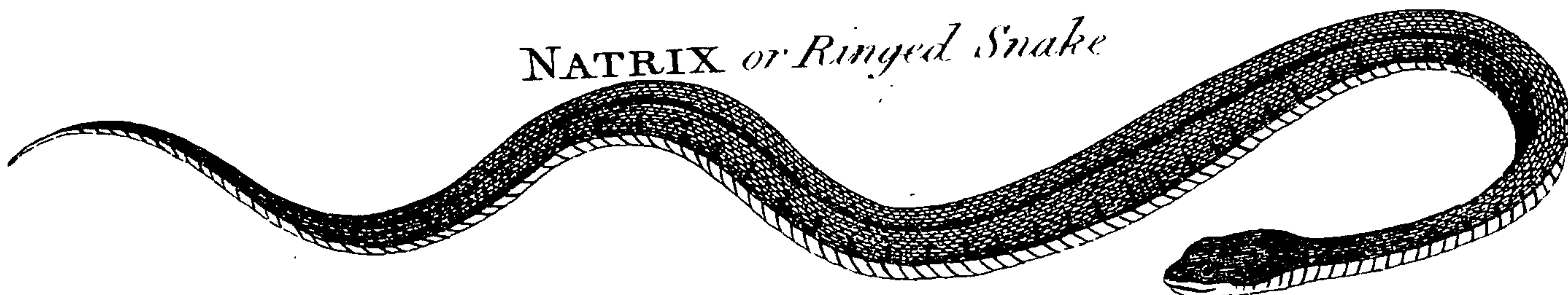
LACERTA viridis



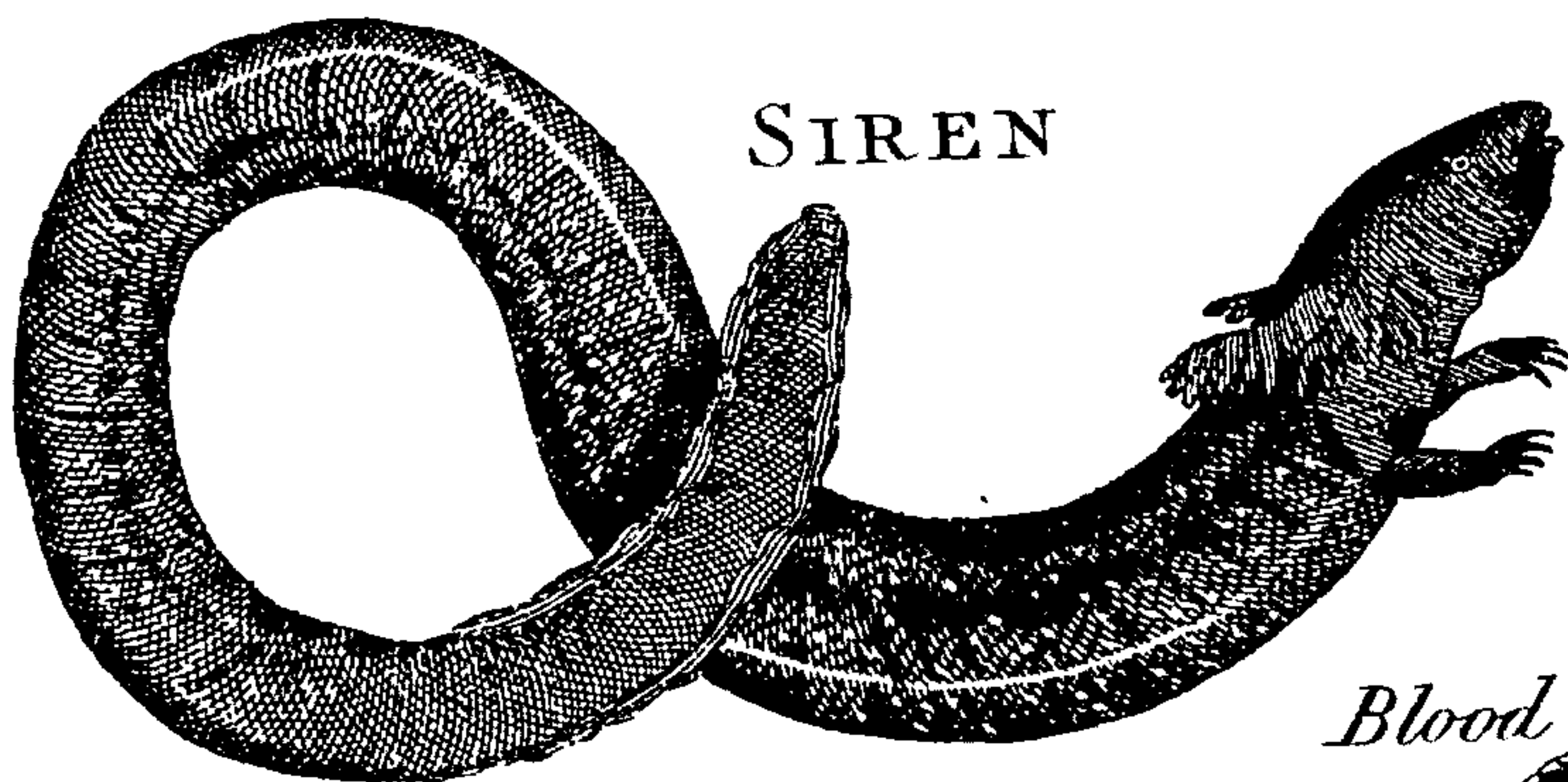
LACERTA vulgaris or Brown Lizard



NATRIX or Ringed Snake



SIREN



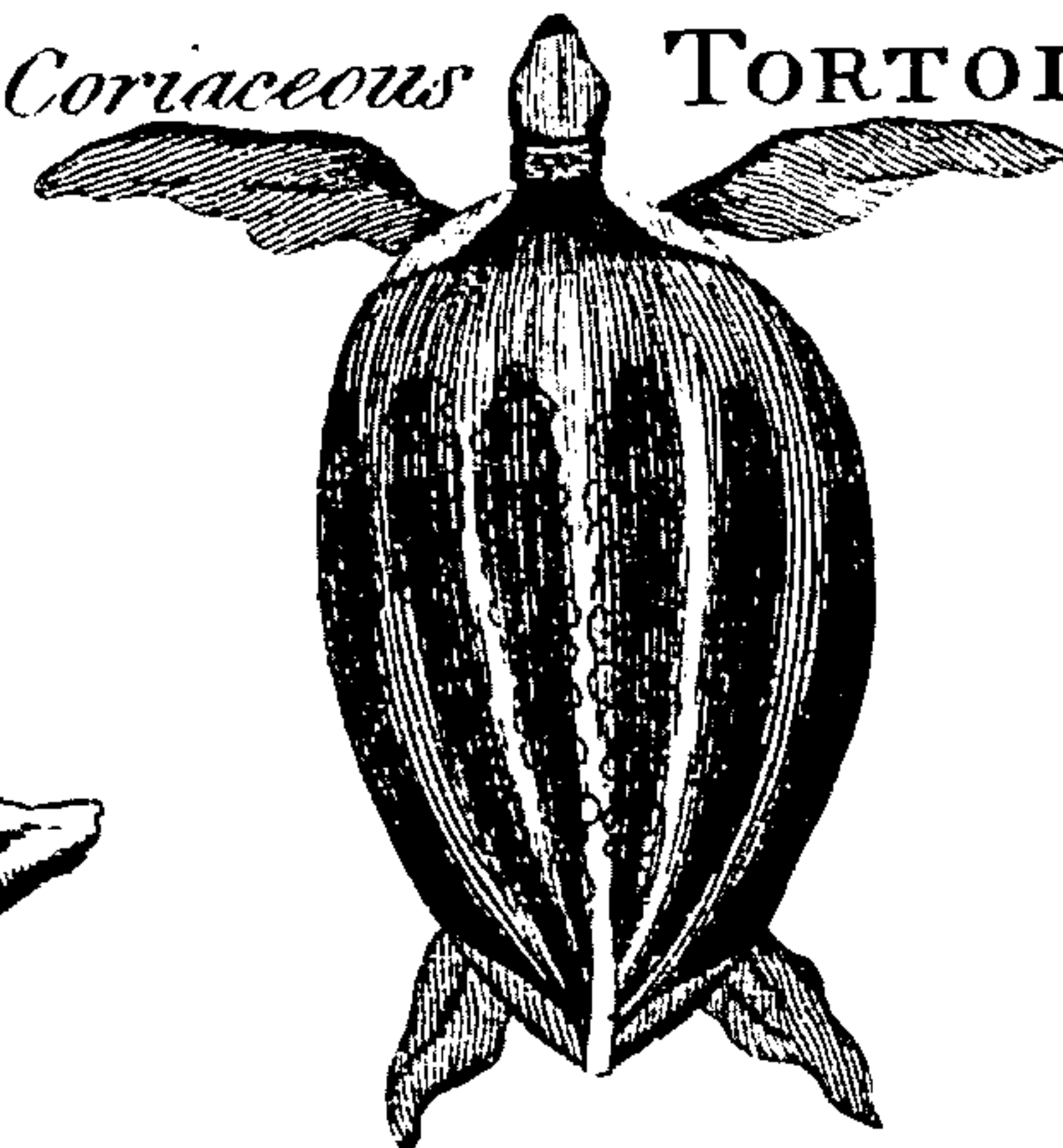
SLOW worm or Blind worm



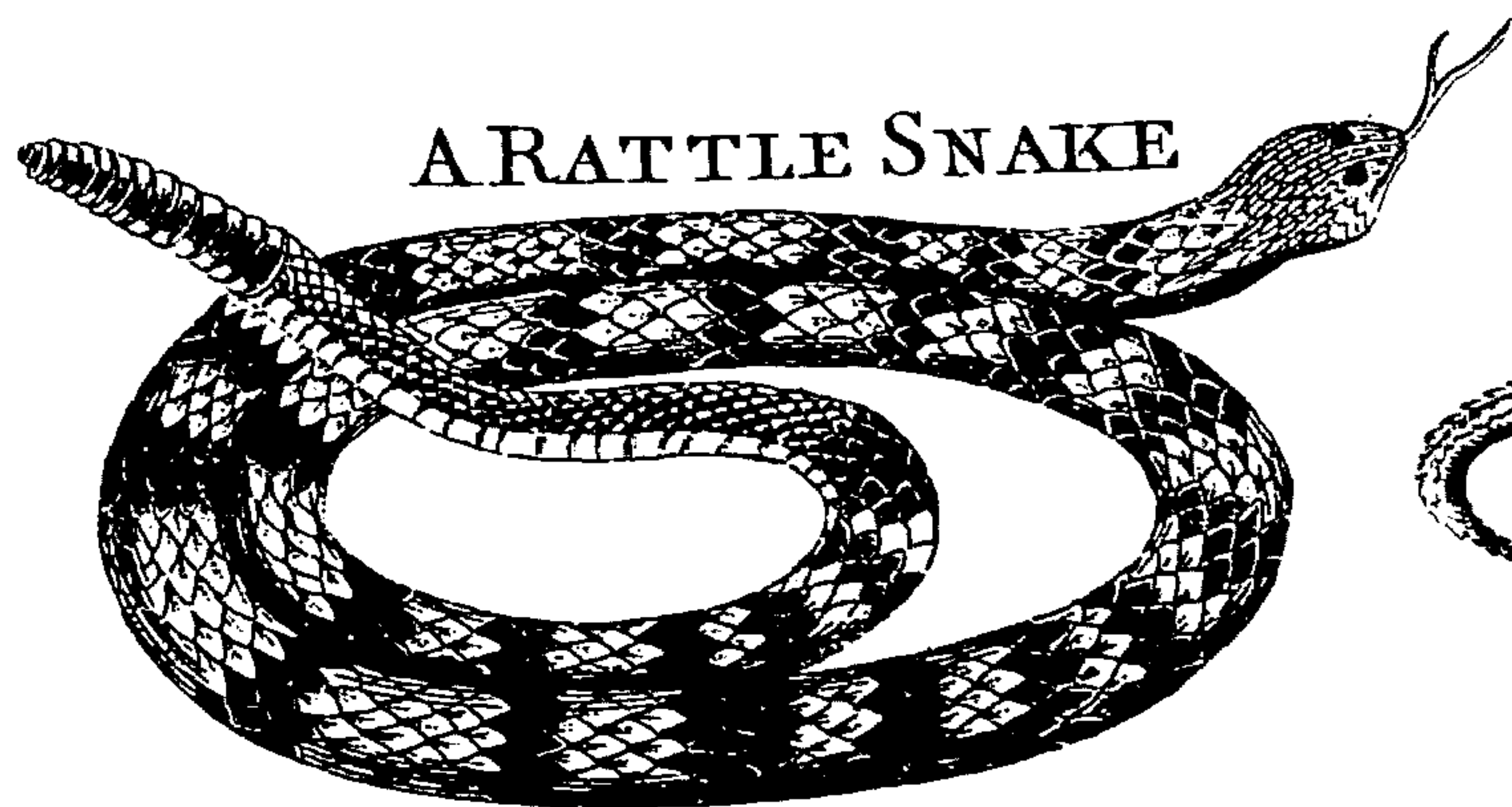
Blood SNAKE or Hemorrhous



Coriaceous TORTOISE



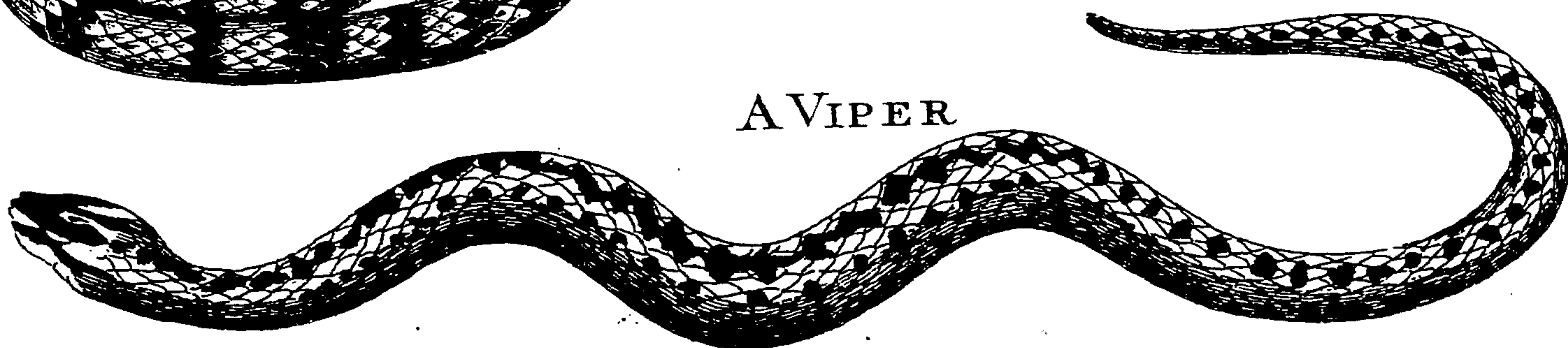
A RATTLE SNAKE



TARANTULA



A VIPER



is entirely an error, and probably has taken its rise from the continual changes it appears to undergo.

An ample description of the Cameleon is given us by Le Bruyn, in his voyage to the Levant. During his abode at Smyrna, he bought several of this kind, and, to try how long they could live, kept four of them in a cage, permitting them at times to run about the house. The fresh sea breeze seemed to give them most spirits and vivacity; they opened their mouths to take it in: he never saw them eat any thing, except now and then a fly, which they took half an hour to swallow: he observed their colour frequently change, three or four times successively, without being able to find out any cause for such alterations: their common colour he found to be grey, or rather a pale mouse-colour; but its most frequent changes were into a beautiful green, spotted with yellow: sometimes the animal was marked all over with dark brown; and this often changed into a lighter brown: some colours, however, it never assumed; and, contrary to what was said above, he found red to be among the number.

Tho' he was particularly careful, he was unable to preserve any of them alive above five months; and many of them died in four. When the Cameleon changes place, and attempts to descend from an eminence, it moves with the utmost precaution, advancing one leg very deliberately before the other, till securing itself by holding whatever it can grasp by the tail. It seldom opens the mouth, except for fresh air; and when that is supplied, discovers its satisfaction by its motions, and the frequent changes of its colour. The tongue is sometimes darted out after its prey, which is flies; and this is as long as the whole body. The eyes are remarkably little, though they stand out of the head: they have a single eye-lid, like a cap with a hole in the middle, thro' which the sight of the eye appears, which is of a shining brown; and round it there is a little circle of a gold colour: but the most extraordinary part of their conformation is, that the animal often moves one eye, when the other is entirely at rest; nay, sometimes one eye will seem to look directly forward, while the other looks backward; and one will look downwards, while the other looks into the air.

NATURAL HISTORY of the VIPER.

THIS animal differs from other serpents, in moving more slowly, in never bounding or leaping, and in bringing its young to perfection before they are excluded. The females of other serpents lay eggs, which are either hatched by the heat of the sun, or in the place of the retreat.

Vipers are found in many parts of this island, particularly in the dry, stony, and chalky countries. Providence is extremely kind in not suffering this species to be prolific; more than ten or eleven eggs being seldom found in one Viper: these are about the size of a blackbird's egg, and appear as if they were chained together.

The Viper seldom exceeds two feet in length, though they are sometimes found very little short of three feet. The ground colour is a dirty yellow; that of the female of a deeper yellow. Its back is marked with a kind of chain of black spots, touching each other at the points. A little below is another row of blackish spots, and on the lower part of the sides there is a line consisting of little white spots, and then another of black, which are larger. The head is inflated, which distinguishes it from the common snake. The tongue is forked; the teeth small; the four canine teeth are placed two on each side of the upper jaw; the instruments of poison are

long, crooked, and moveable; and can be raised and depressed at pleasure: they are hollow from near the point to their base, and the action which gives the wound, forces the fatal juice into it, thro' the tooth.

Vipers generally cast their skins twice a year, and the succeeding ones always appear brighter and more beautiful, than those which they have quitted. Soon after this another skin begins to be formed; so that it may be said always to have a double skin. When the skin is taken off, and the Viper cut into several pieces, it will remain alive for several hours, and the head is always ready to bite; nor will the bite be less dangerous than at another time. Vipers do not, like other serpents, make holes in the earth; but usually hide themselves under stones, or the ruins of old houses. In fine weather, however, they are frequently found in tufts of grass, and among bushes.

This animal is said not to arrive at its full growth in less than six or seven years; but it is capable of engendering at three.

The tongue of the Viper consists of two long fleshy round bodies, which terminate in sharp points, and are very pliable. It is about an inch and an half in length, and its root is strongly connected to the neck by two tendinous bodies, near a quarter of an inch in length. The tongue of some Vipers has three or four points; and, though they are often darted out, they do no injury, except that of terrifying those that behold them; for they principally serve to catch the small animals on which the Viper feeds.

We are assured, from good authority, that the young of the Viper, when terrified, will run down the throat of the parent, and seek shelter in its belly, in the same manner as the young of the opossum, retire into the ventral pouch of the old one. Hence it has been imagined by some, that the Viper is so unnatural as to devour its own young.

These animals, when at liberty, remain torpid throughout the winter; but when they have been confined, they have never been observed to take their annual repose.

Aretæus, says Dr. Mead, who has most accurately described the elephantiasis, commends, as Craterus did, the eating of Vipers, instead of fish, in the same diseases. And to this purpose we remember, that as Lopez, in his relations of the kingdom of Congo, in Africa, takes notice how greedily the negroes eat adders, roasting them, and esteeming them as the most delicious food; so Dampier, also, informs us, that the natives of Tonquin, in the East-Indies, treat their friends with arrack, in which snakes and scorpions have been infused, accounting this, not only a great cordial, but also, an antidote against the leprosy, and all other sorts of poison.

The physicians in Italy and France, very frequently prescribe the broth and jelly of Vipers flesh, for much the same uses, that is, to invigorate and purify the mass of blood exhausted with diseases, or tainted with some vicious and obstinate ferment.

From all this it appears, that the main efficacy of the Viperine flesh, is, to quicken the circulation of the blood, promote its due mixture, and by this means cleanse and scour the glands of those stagnating juices, which, turning to acidity, are the origin of many, at least, of those troublesome distempers in the surface of the body, which go under the names of scrophulous, and leprous.

These good effects are owing to that penetrating, strong salt, with which the substance of these creatures, in a very great proportion, abounds; and the reason of this is from the food they live on, which are lizards, moles, &c. whose nature every one knows to be such as must necessarily, when they are dissolved

dissolved in the stomach, supply the blood with a great quantity of active and volatile parts. And herein lies the difference between the flesh of Vipers, and that of other innocent serpents, which, feeding upon grass and herbs, do not recommend themselves to us by any of those properties, which are in so eminent a degree found in the former.

Whoever reflects on what has been said on this head, will very readily acknowledge, that our physicians deal too cautiously or sparingly with a remedy, which may be applied to very good purposes, when they prescribe a few grains of the powder of dried Vipers, or make up a small quantity of their flesh in troches; whereas, if service be really to be done this way, the patient ought to eat frequently of Viper jelly, or broth; or rather, as the ancient manner was, to boil Vipers, and eat them like fish; if this food will not go down, (though really very good and delicious fare) to make use at least of wine, in which Vipers have for a long time been infused, by which we know a very obstinate lepra has been removed; or, lastly, in some cases, especially where wine is not convenient, to take good quantities of their volatile salt, in which alone the virtue of the before-named medicines principally reside.

It is worthy our observation, continues Dr. Mead, that the Viper can move the jaw-bones on one side, without moving those of the other; for they are not joined together at the extremes, as in other animals; which contrivance is very beneficial to it in the swallowing its prey; for while the teeth on one side stand unmoved, and fixed in the flesh to hold it, those on the other side are brought forward, to draw it in farther; then they keep it fast till the former jaws advance again in their turn: thus they act successively, and force the animal entire into the oesophagus, whose muscular fibres are very weak, and can help but little in the business.

The symptoms which follow upon the bite of a Viper, when it fastens either one or both its greater teeth, in any part of the body, are an acute pain in the place wounded, with a swelling, at first red, but afterwards livid, which, by degrees, spreads farther to the neighbouring parts with great faintness, and a quick, though low, and sometimes interrupted pulse, great sickness at the stomach, with bilious convulsive vomitings, cold sweats, and sometimes pains about the navel; and if the cure be not speedy, death itself, unless the strength of nature proves sufficient to overcome these disorders; and though it does, the swelling still continues inflamed for some time; nay, in some cases, more considerably upon the abating of the other symptoms, than at the beginning; and often, from the small wound, runs a sanious liquor, and little pustules are raised about it; the colour of the whole skin is changed yellow, as if the patient had the jaundice.

These mischiefs, although different climates, season of the year more or less hot, the greater or lesser rage of the Viper, the beast itself, of a larger or smaller size, and, consequently, able to communicate more or less venom, and the like circumstances, may variously heighten or abate them, yet usually discover themselves much after the same manner in all; unless the bite happen not to be accompanied with the effusion of that liquor, which is the main instrument and cause of this violent and shocking disturbance.

But before we proceed to enquire into the nature and manner of acting of this juice, it may be proper to take notice, that this is not made on purpose to be deadly and destructive to mankind; but that the true design of it is (though authors have not regarded it) to perform an office and service of so great moment to the preservation of the individual, that without it this creature could not subsist.

For Vipers live principally upon lizards, frogs,

toads, mice, moles, and the like animals, which they do not chew, but swallow down whole, and they lie in the stomach; or if that be not large enough to receive them, partly in that, and partly in the oesophagus, which is membranous, and capable of great distention, till by the salival juices of those parts, together with the help of the fibres of the stomach, and the contraction of the muscles of the abdomen, they are gradually dissolved into a fluid substance, fit for the nourishment of their bodies, which is the work of many days: this is one reason why these creatures can live so long without taking any fresh food, which they have been known to do three or four months; another is, that their blood is a grosser and more viscid fluid than that of most other animals; so that there is but a very little expence of it, by transpiration, and, consequently, less need of recruit; this not only microscopes discover, but reason teaches; because there is but very little muscular force in the stomach to comminute the food, and make a chyle of fine parts; and therefore the blood must accordingly be of a tough and clammy consistence. Besides, the heart of a Viper has properly but one ventricle, and the circulation of the blood is performed after the same manner as it is in a frog and tortoise, in which not above one-third of it passes through the lungs; on which account its communication in them by the air is proportionably lesser than in other animals. Now such a manner of feeding as this, necessarily requires that the prey should, upon the first catching, be immediately killed, otherwise it were by no means fit to be let into the stomach; for we are not to think, that the force of this part would be alone sufficient to destroy it, the subtlety of a living creature (besides the consideration of the weakness of the fibres) being in a great measure able to elude that, as indeed we every day find live animals in the stomachs of others; and therefore to do this, is the proper use both of the teeth and their poison; for which being designed and adapted, it is no wonder if the Viper, the same way by which it destroys its prey, proves sometimes mischievous to any other creature besides, when it happens to be enraged, or by any provocation stirred up to bite.

It is worth the while, says Dr. Mead, in the next place, to consider the cure of this mischief, which, without all doubt, ought to be by such external management of the wound as may immediately destroy the infused venom.

Boyle experienced an hot iron, held as near the place as the patient could possibly endure it, very effectual to this purpose: but the same method did not answer expectation, in the famous case related by Charas.

An extraordinary virtue against this and other venomous bites, is ascribed to the snake-stones brought from the East-Indies, one of which is to be presently applied to the part, and let stick till it drop off: these are said to be taken out of the head of the serpent, called by the Portuguese, cobra de capello, and to suck the poison out of the wound. Redi made trials with several of them, but found no service from any: yet Baglivi tells us of a terrible bite of a scorpion cured this way. Monsieur Charas's pigeons all died, though these were immediately clapped on, and stuck close to the wound: but Havers saw a good effect of one upon a dog, who, though severely bitten, suffered no harm; nor any farther mark of the poison, than a livid circle round the place.

In plain truth, as these celebrated stones do not seem to be what it is pretended they are, but rather factitious bodies, compounded, perhaps, of calcined bones, and some testaceous matters mixt together; so, by reason of their spongy and porous texture, they very readily adhere to any moistened part of the

the flesh, and imbibe whatsoever humidity they meet with: this their quality any one may experience, by holding one of them to the roof of his mouth: and it is upon this score that, when put into water, bubbles are raised by the air in their interstices, which some have too fondly thought to be the effects of their throwing out the venom they had sucked in.

Their make being thus, some part at least of the poisonous juice may easily be drawn out of the wound, by such an application; and yet so much of it may sometimes happen to remain in the flesh, as may make the bite however to prove mortal. And thus it fared with a pigeon, to the thigh of which, first bitten by a Viper, one of the stones was applied; for though it stuck fast to the wound, and thus saved the life for about four hours (whereas others usually died in about half an hour), yet, after this, the mortification of the part prevailed to that degree as to become fatal to the tender creature.

But our Viper catchers have a remedy far beyond all these, in which they place so great confidence, as to be no more afraid of a bite than of a common puncture, immediately curing themselves by the application of their specific.

This, though they keep as a great secret, we have, however, upon strict inquiry, found out to be no other than the *axungia viperina* presently rubbed into the wound. And to convince ourselves of its good effects, a Viper was enraged to bite a young dog in the nose; both the teeth were struck deep in; he howled bitterly, and the part began to swell. We diligently applied some of the *axungia* that was ready at hand, and he was very well the next day.

But because some gentlemen who saw this experiment were apt to impute the cure rather to the dog's spittle (he licking the wound) than to the virtue of the fat, we caused him to be bit again in the tongue, forbearing the use of our remedy, and he died within four or five hours.

At another time a like trial was made with the same success.

As this *axungia* consists of clammy and viscid parts, which are withal more penetrating and active than most other oily substances, so these, without all doubt, involve, and as it were, sheath the volatile salts of the venomous liquor, and thus prevent their shooting out into those crystalline spicula, which we have observed to be the main instruments of that deadly mischief which attends the bite.

By this means it comes to pass, that this cure, if rightly managed, is so easy and certain, as not to need the help of any internal medicines to forward it; but these however must take place where, through want of the other, the poison is spread farther, and has tainted the whole mass of blood.

Nor yet is it necessary, even in this case, to fatigue the patient with a sarago of theriacs and antidotes; for the volatile salt of Vipers is alone sufficient to do the work, if given in just quantities, and duly repeated; provided moderate sweats be encouraged in bed: thus it succeeded with Monsieur Charas, and in some others we could relate; in one of which the mischief had gone so far as to induce an universal icterus.

We must remark, that since Dr. Mead wrote the treatise of poisons, from which some of these particulars relative to the Viper are extracted, a man and his wife, who made it their business to catch Vipers, came from Bath to Oxford, and from thence to London; and, after having shewn a great number of experiments, with respect to the bite of this animal, at last discovered an effectual remedy, which consists in nothing more, than chafing the part wounded with olive oil, before the fire; and, if the case should be extremely bad, wrapping the entire

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affected limb in a cerate, made of white-lead, and the same oil.

We must further observe, that as the viperine poison acts by inducing a coagulation of the blood, which spreads gradually from the wounded part to the heart, of which we have seen an hundred incontestible instances; and as rubbing in the oil, prevents the coagulation, and resolves the blood already coagulated; hence, perhaps, we may account for the efficacy of unguents, so much practised by the antient physicians, especially those of the methodic sect.

The JAVAN VIPER.

This animal is covered with scales of a sea green colour, and surrounded with stripes of a dark tawny; running transversely round the body, from the head to the tail. The head is defended with large reddish scales, with two transverse stripes over the eyes. It has a red circle round the neck, and the scales on the belly are of a bright yellow, bordered on the sides with a small black line.

The VIPER of CEYLON.

It has two small eyes seated over the nostrils, and the appearance of two others, but they are only two whitish spots over the jaws, that resemble eyes. The nose is covered with large black scales, which are adorned with an undulated black and red streak. The belly is of a bright yellow, spotted with red, and furnished with whitish scales.

NATURAL HISTORY of the AMMODYTES of CEYLON.

THIS is a very large and dangerous serpent, and its mouth is furnished with a great number of sharp teeth. The eyes are large and sparkling, and on the forehead are small round scales of various colours; some of which are yellow, others red, and others of a mixture of red and black: the body, above and below, is of a whitish ash colour; and on the back are angular spots, variegated with white and brown. The scales on the upper part of the body are placed like net-work, with large meshes; and the tail is spotted with brown, ending in a bony point.

NATURAL HISTORY of the GERENDA.

THIS serpent inhabits the East Indies, where divine honours are paid to it. The skin is finely spotted, and covered with very thin scales of a yellowish ash colour, and encircled with red bands, which appear like ribbands. The head is oblong, resembling that of a hound, and is of a pale ash colour: the eyes are lively and sparkling; the teeth small and slender; and the nostrils large: the transverse scales on the belly are of a yellowish ash colour, and the small scales of a bright ash colour, spotted in the middle with a deep red. This serpent generally lies folded up. It is held in the highest veneration in Calicut and Japan, but the inhabitants of Malabar are greatly afraid of it.

NATURAL HISTORY of the GIBOYA.

THIS is the largest of all the Brazilian serpents: Leguat informs us, he has seen one fifty feet in length; and we have the concurrent testimony of missionaries and historians as a further proof. The largest of this kind that has been brought into Europe

3 X

rope did not exceed thirty-six feet in length. The most usual length, however, of this animal, is about twenty feet, and the thickness in proportion. The teeth are very small in proportion to the body, and this serpent is without venom. It lies in wait for wild animals near the paths, and when it throws itself upon one of them, it winds about it so closely, and with so much strength, that it breaks all its bones; then moistening the whole body over with its flaver, it renders it fit for swallowing whole.

NATURAL HISTORY of the BOIGUACU.

THIS serpent is the next in magnitude to the giboya, and has often been seen to swallow a goat whole. It is thickest in the middle of the body, and grows shorter and smaller towards the head and the tail. A chain of small black spots runs along the middle of the back, and extend the whole length of the animal; on each side there are large round black spots, at some distance from each other, which are white in the centre. Between these, near the belly, are two rows of smaller black spots, which run parallel to the back. In each jaw it has a double row of sharp teeth: the head is broad, and there are two prominences over the eyes. This serpent has two claws, resembling those of birds, near the extremity of the tail. It is observed by Piso, that these serpents lie hid in the thickets, from whence they fall out unawares, and raising themselves upright on their tails, will attack both men and beasts. When exasperated, they make a loud hissing noise, and sometimes dart from the trees upon travellers, and twist themselves so closely round their bodies, as to dispatch them in a very few minutes. Condaminel, however, makes no mention of this, but he affirms that their bite is not dangerous; for though the teeth are so large as to create terror in the mind of the beholder, their bite is not attended with any other consequence, than what may proceed from an ordinary wound. This serpent is called *Cobra de Veado* by the Portuguese.

NATURAL HISTORY of the AMPHISBÆNA, or DOUBLE-HEADED SERPENT.

THIS animal is remarkable for moving along with either the head or the tail foremost, as the Greek name imports: many authors have therefore affirmed that this serpent has two heads; which cannot possibly be true, there being no such animal in nature. It is probable that this error took its rise from the thickness of its tail; for this serpent is equally thick at each end, and the colour of the skin is like that of the earth. It is rough, hard, and variously spotted. It is an inhabitant of Lybia and the island of Lemnos.

NATURAL HISTORY of the DEPONA.

THIS is a very large serpent, and is a native of Mexico. The head and jaws are very large: the mouth is armed with cutting crooked teeth. There is a broad scaly border round the mouth; and the eyes are so large as to give it a very terrible aspect. The forehead is covered with large scales, on which others, which are smaller, are curiously ranged. Each side of the belly is marbled with large square spots, of a chestnut colour, in the middle of which is a round yellow spot. This serpent avoids the sight of man, and therefore cannot do much injury.

NATURAL HISTORY of the RATTLE-SNAKE.

THIS serpent is bred only in America: the usual length is from four to five feet, but they are sometimes seen six feet in length, and as thick as a man's leg. It resembles the viper in many particulars: like that animal, it has a large head, and a small neck: it is of a dusky colour, and is furnished with fangs capable of inflicting the most terrible wounds. It has a large scale, which hangs like a pent-house over each eye. The Rattle-Snake is of an orange, tawny, and blackish colour on the back; and of an ash colour on the belly. The male may be readily distinguished from the female, by a black velvet spot on the head, and by the head being smaller and longer. But what principally distinguishes this serpent is the rattle, an instrument lodged in its tail, by which it makes such a loud rattling noise when it moves, that its approach may be known, and the danger avoided. This rattle is composed of several thin hard hollow bones, linked to each other, and rattling upon the slightest motion.

Some have asserted that this serpent acquires an additional bone every year; from whence its age may be precisely known: it is certain, however, that snakes of only a year or two old have no rattles at all, but some old ones have been found with twelve or thirteen joints.

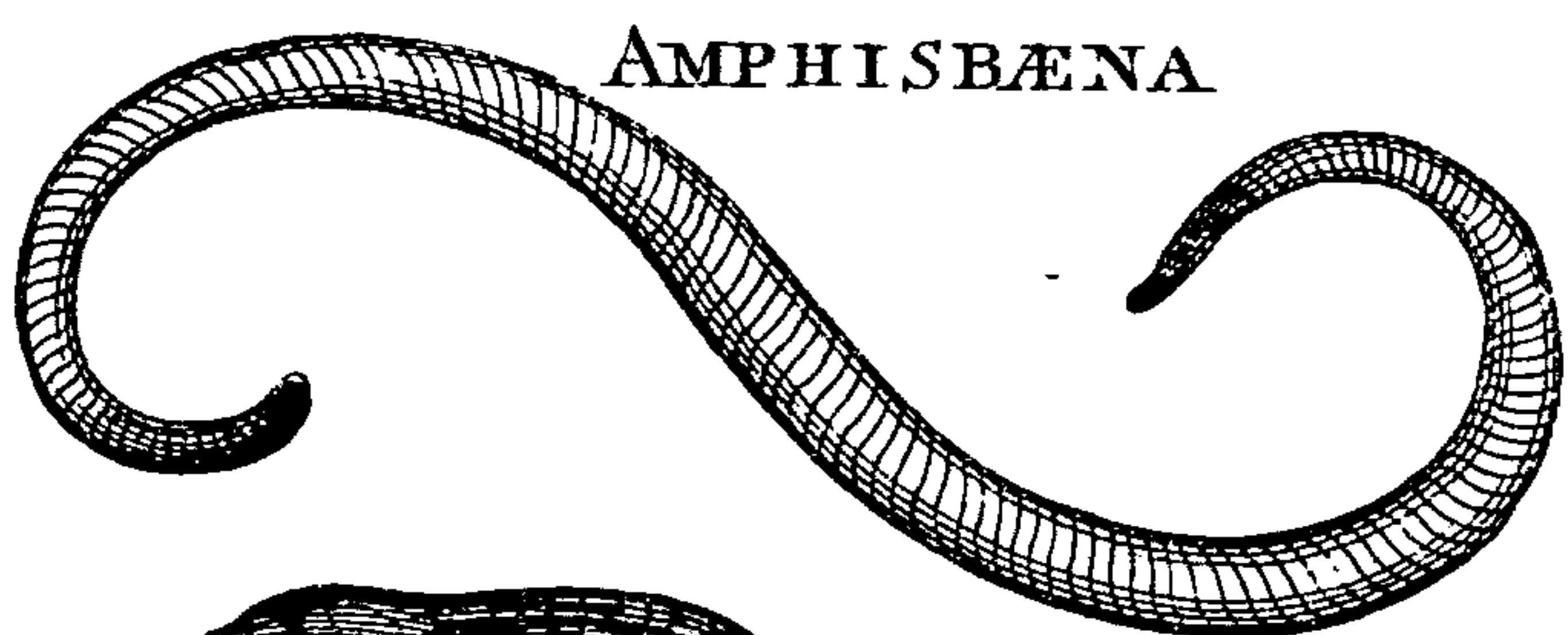
The certain death which accrues from the terrible bite of this creature, makes a solitude wherever it is heard. It moves along with majestic rapidity; but never unprovoked attacks any thing but its prey; but when accidentally trod upon, or pursued for its destruction, it makes a most dreadful and desperate defence. It erects the tail, throws back the head, and instantly inflicts its wound: then parts, and inflicts a second wound; after which, some travellers assure us, that the animal becomes torpid and inactive, and never even attempts to make its escape.

The very instant the puncture is made, it is more painful than the sting of a bee, and this pain grows every moment more excruciating and dangerous: the limb swells; the venom reaches the head, which swells to an enormous size; the eyes are red and fiery; the heart beats quick; the pain becomes insupportable, and some expire under it in five or six hours: those of strong constitutions may endure the agony a few hours longer, and at last sink under a general mortification.

A gentleman in Virginia trod accidentally upon a Rattle-Snake, which had been lurking in a stony place: the enraged animal reared up, bit his hand, and shook its rattles. The gentleman, unwilling to die unrevenged, killed the snake, and carrying it home in his hand, threw it on the ground before his family, crying out, "I am killed, and there is my murderer!" His arm, which was beginning to swell, was immediately tied up near the shoulder, the wound was anointed with oil, and every means employed to stop the infection. His arm, below the ligature, appeared of several colours; all the muscles were in motion; a fever ensued; after that the loss of his hair, giddiness, drought, weakness, and nervous faintings; till, by slow degrees, a very strong constitution overpowered the latent malignity of the poison, and he recovered; but not without feeling the most various and dreadful symptoms for several weeks afterwards.

Many have affirmed that the Rattle-Snake has the power of charming squirrels, hares, birds, and other animals, in such a manner as to make them run directly into its mouth. In Pennsylvania, this serpent is often seen basking at the foot of a tree. There, coiled upon its tail, its jaws extended, and its eyes shining like fire, it levels its dreadful glare upon

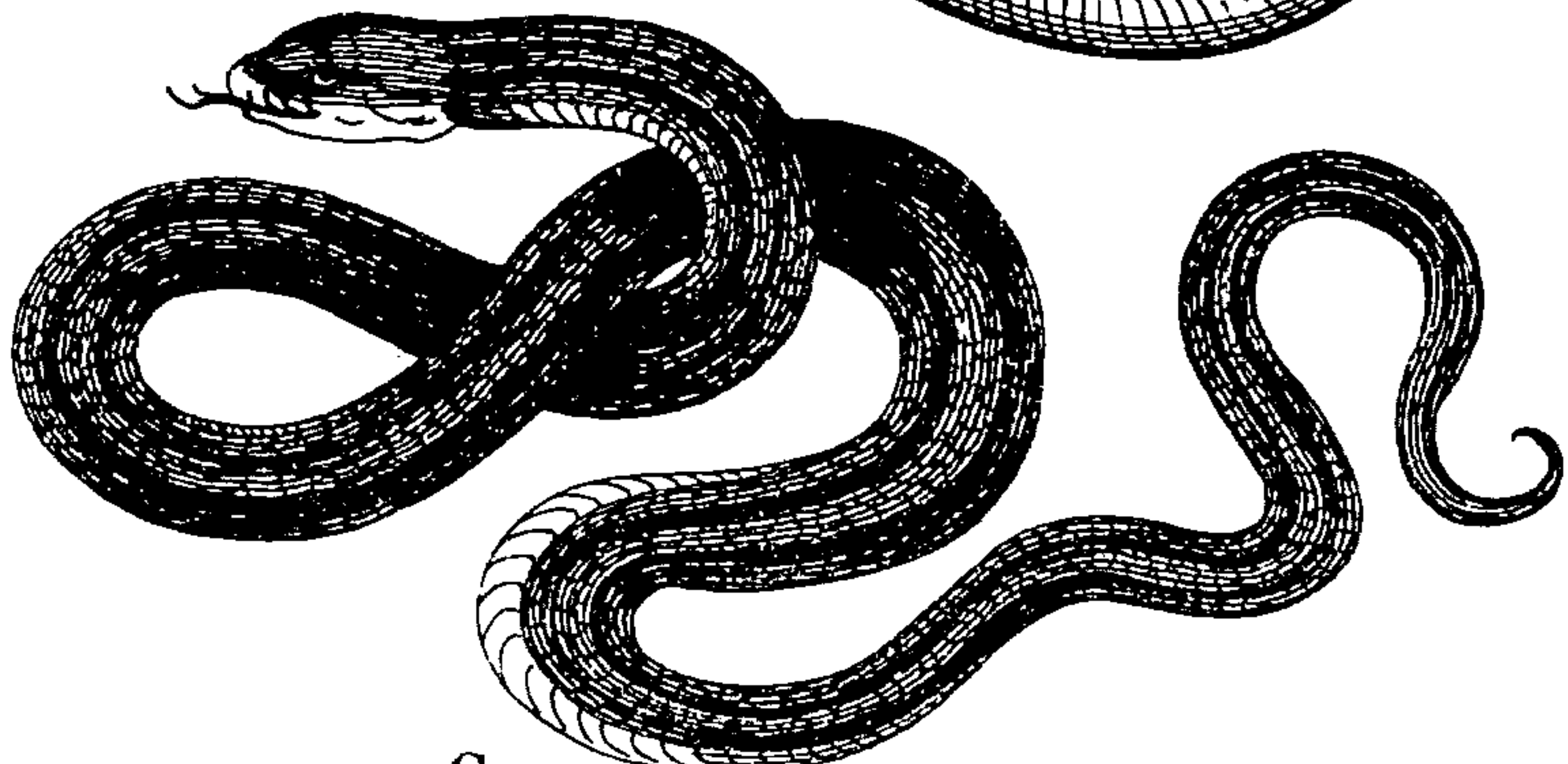
SERPENTS, LIZARDS & TORTOISES.



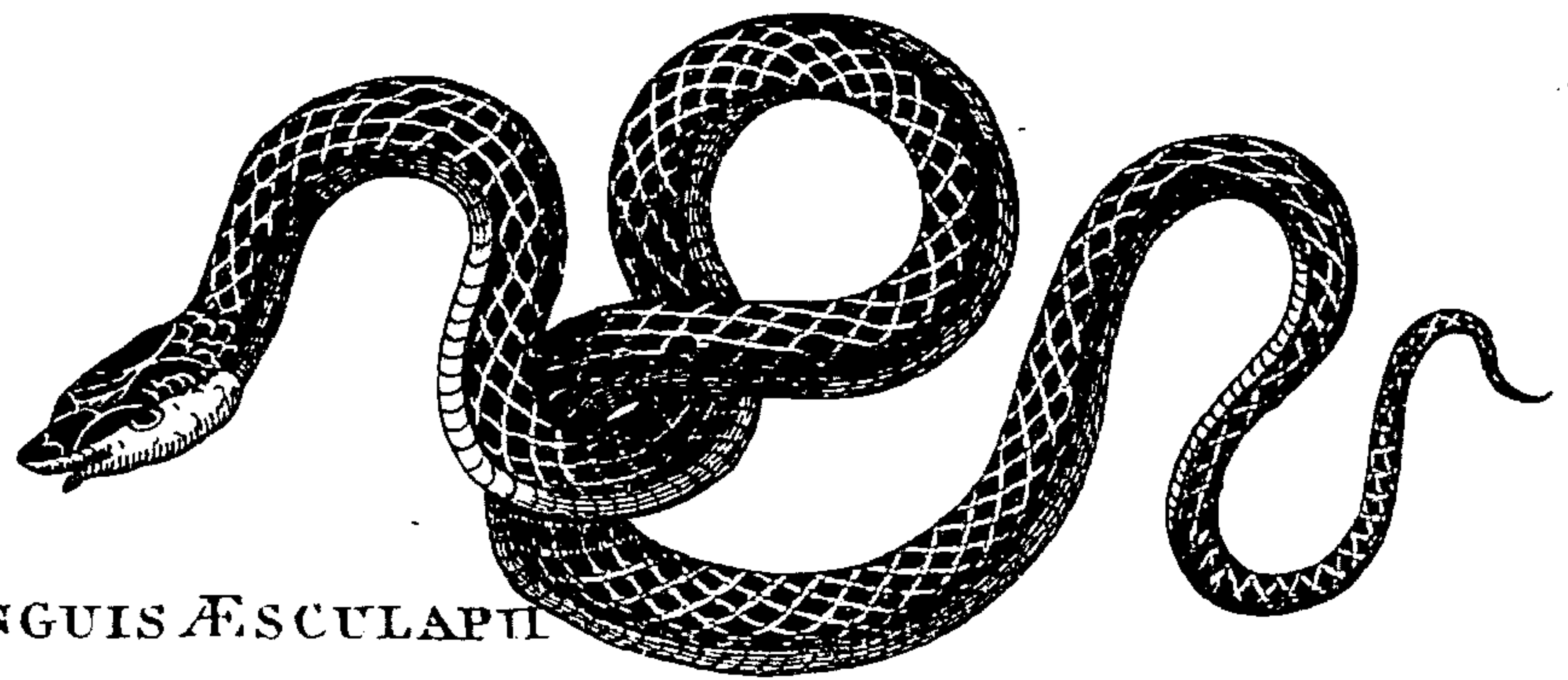
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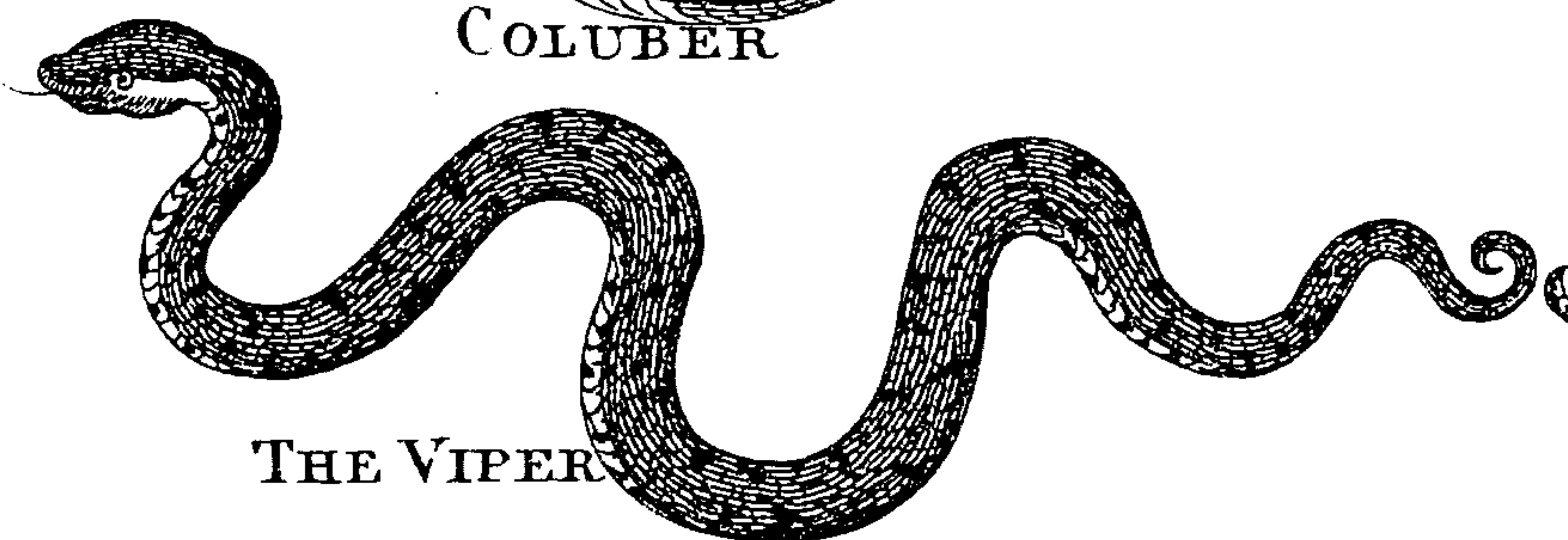
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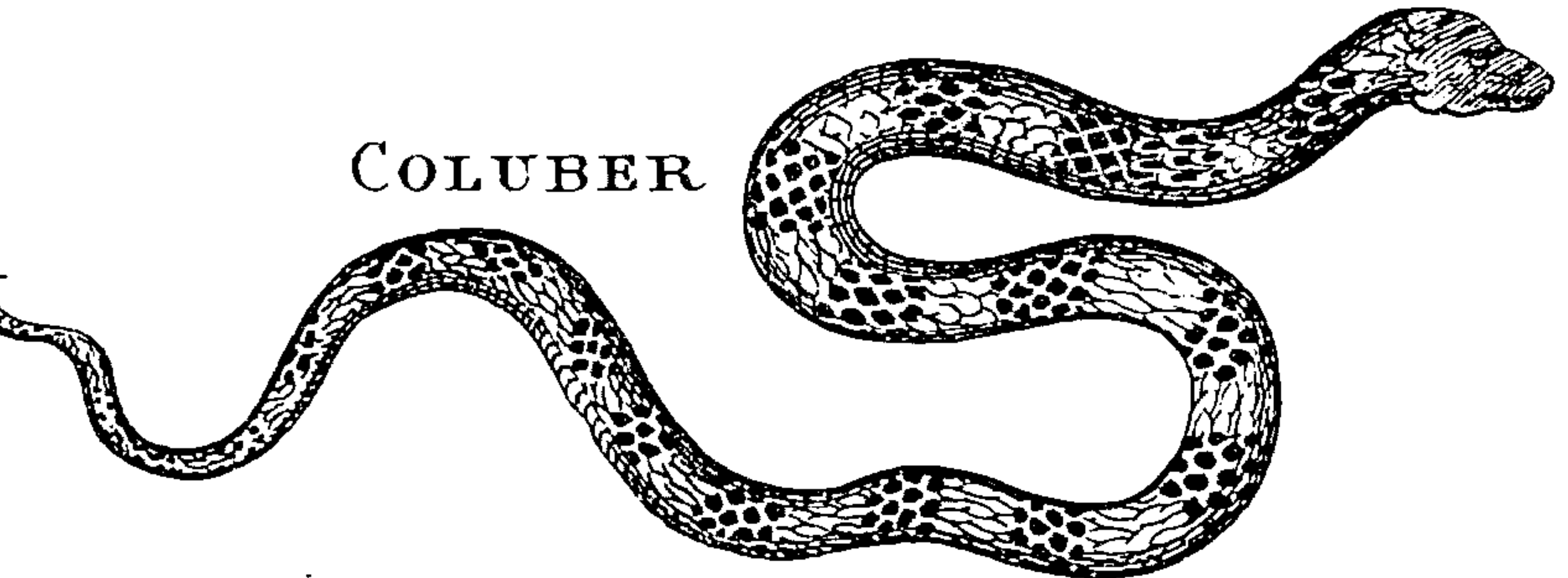
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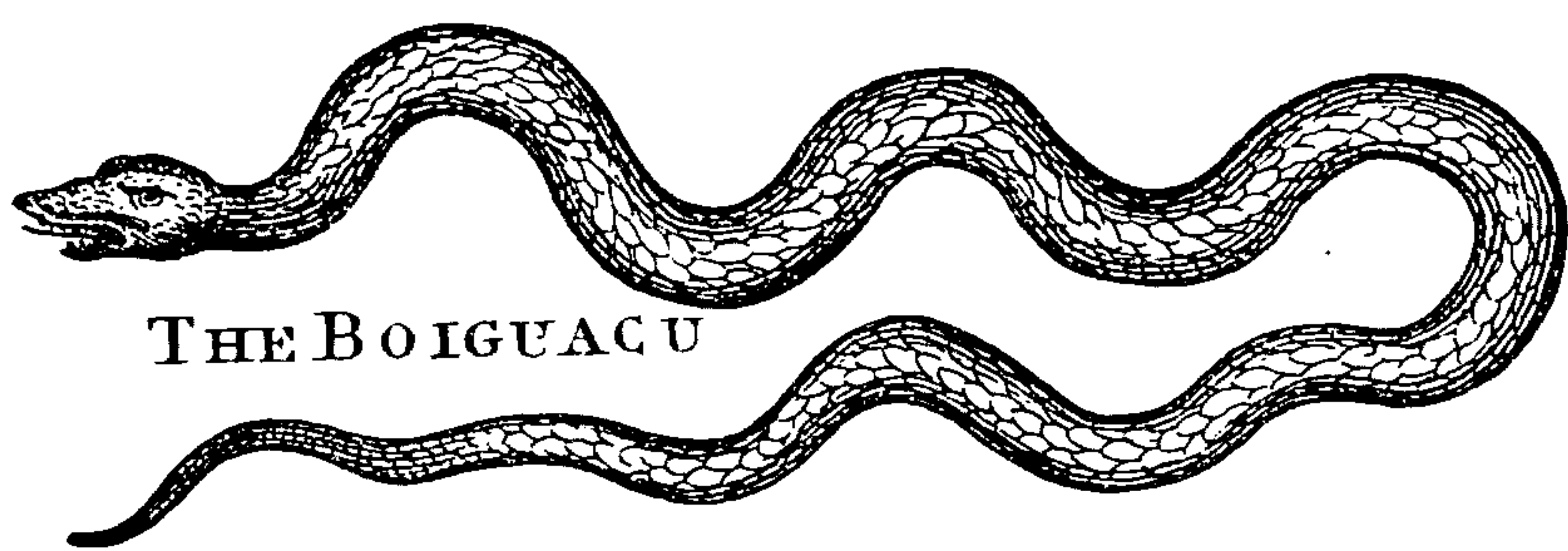
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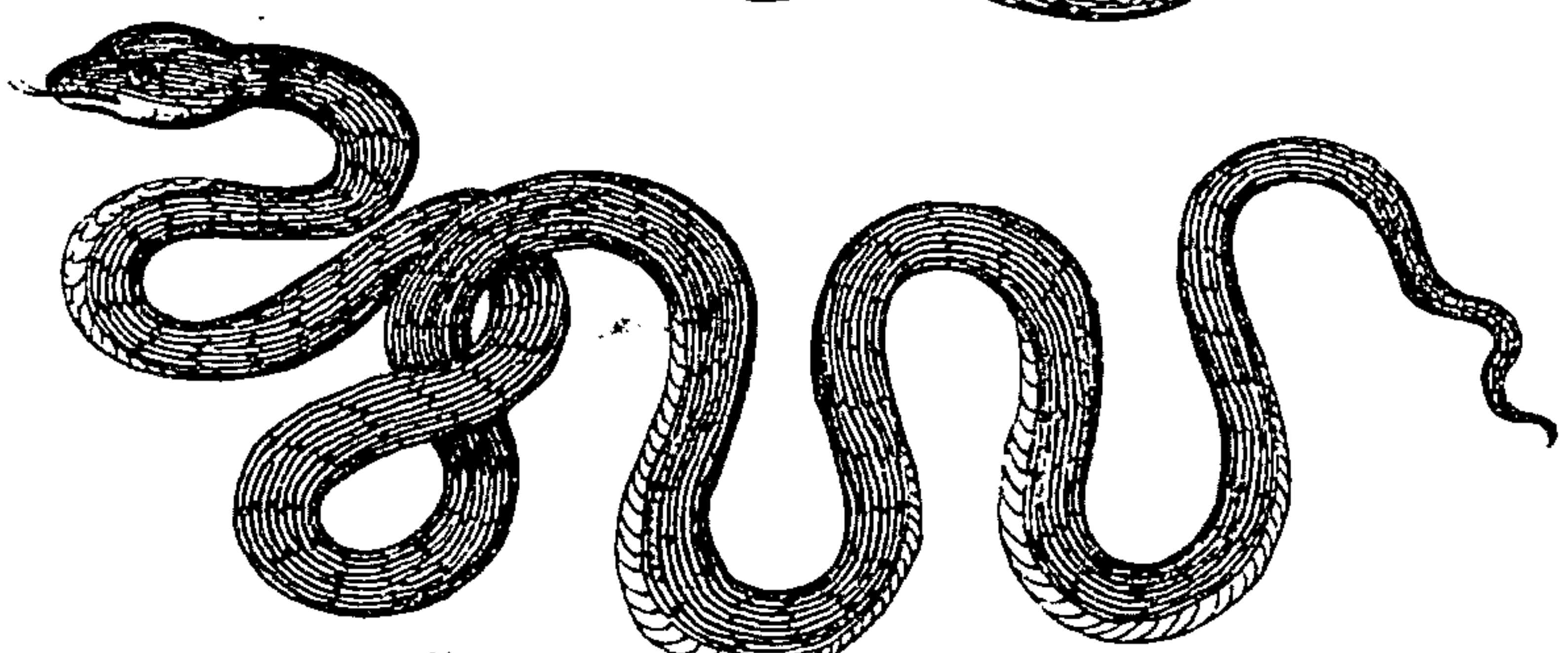
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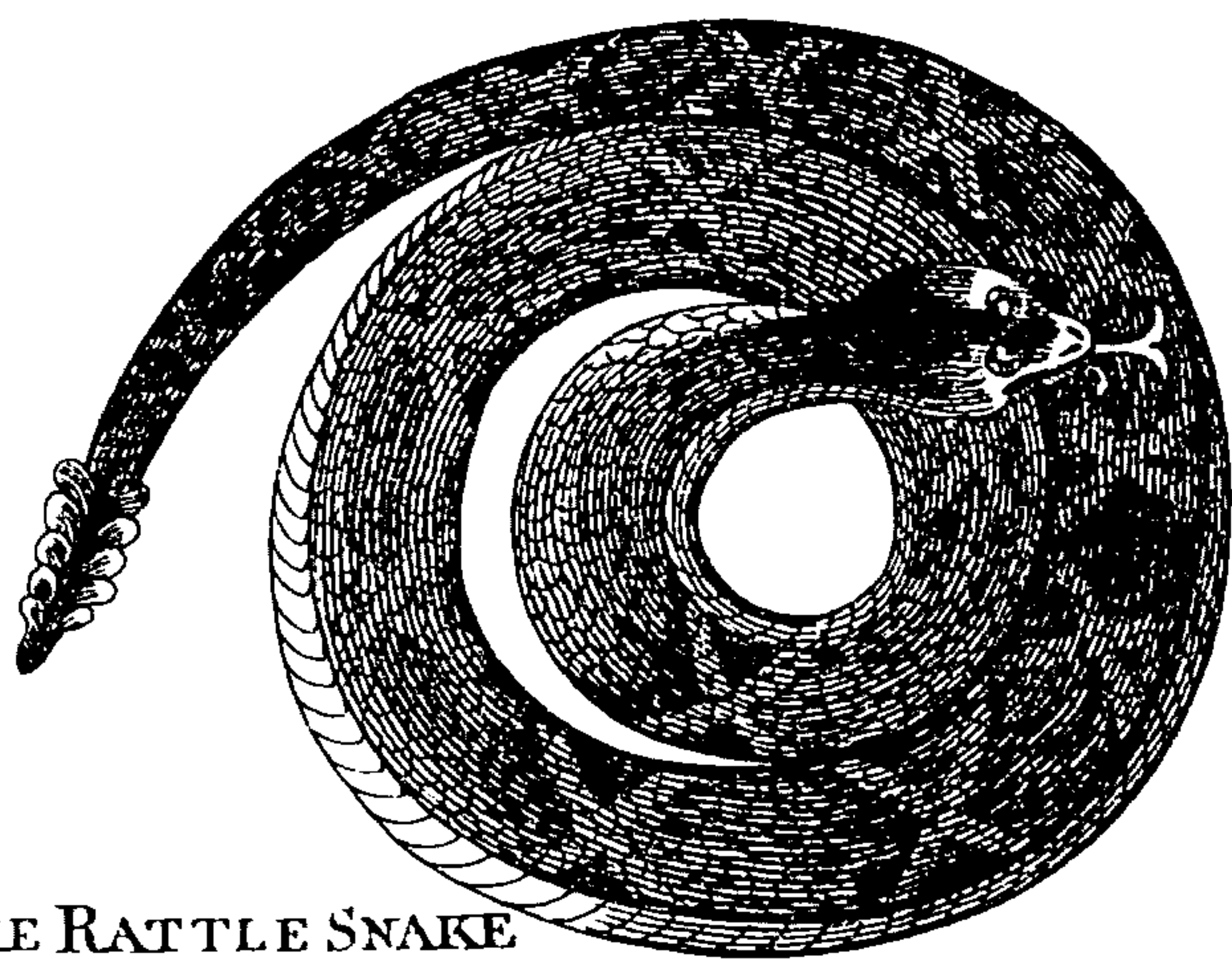
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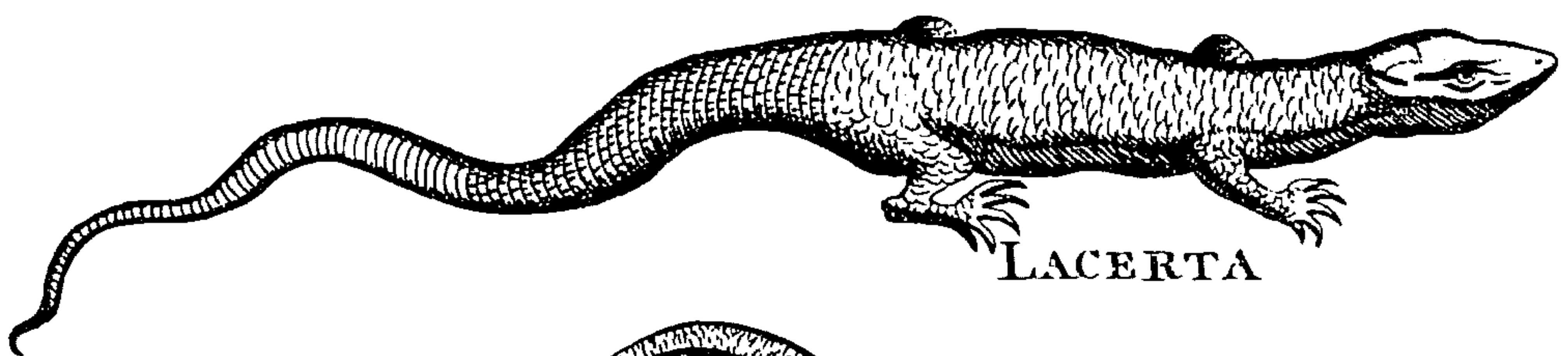
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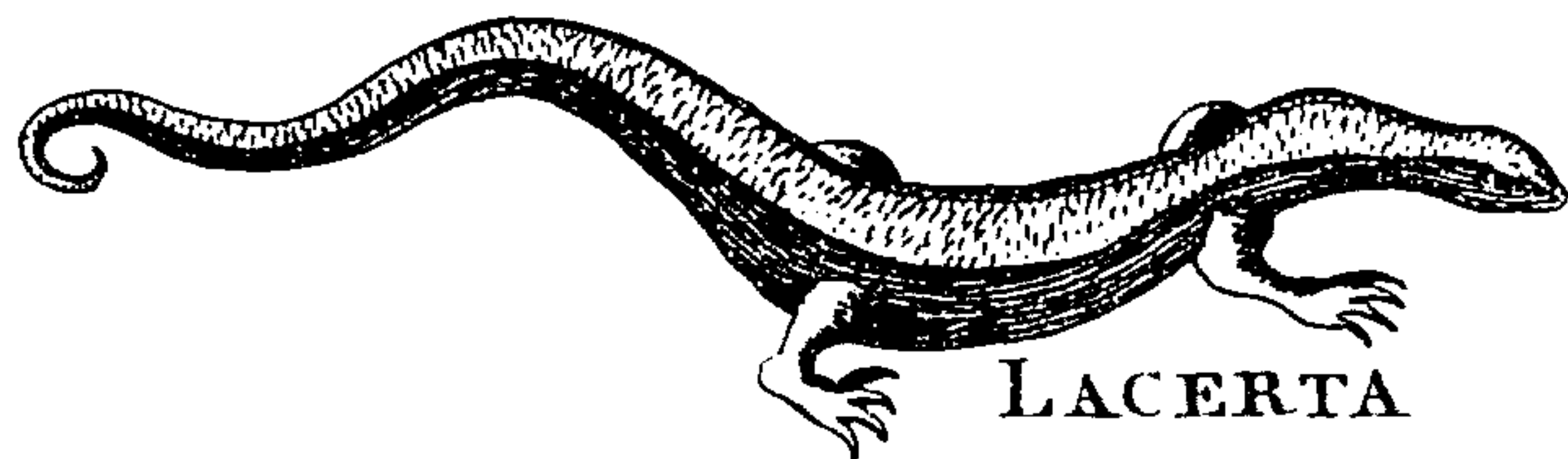
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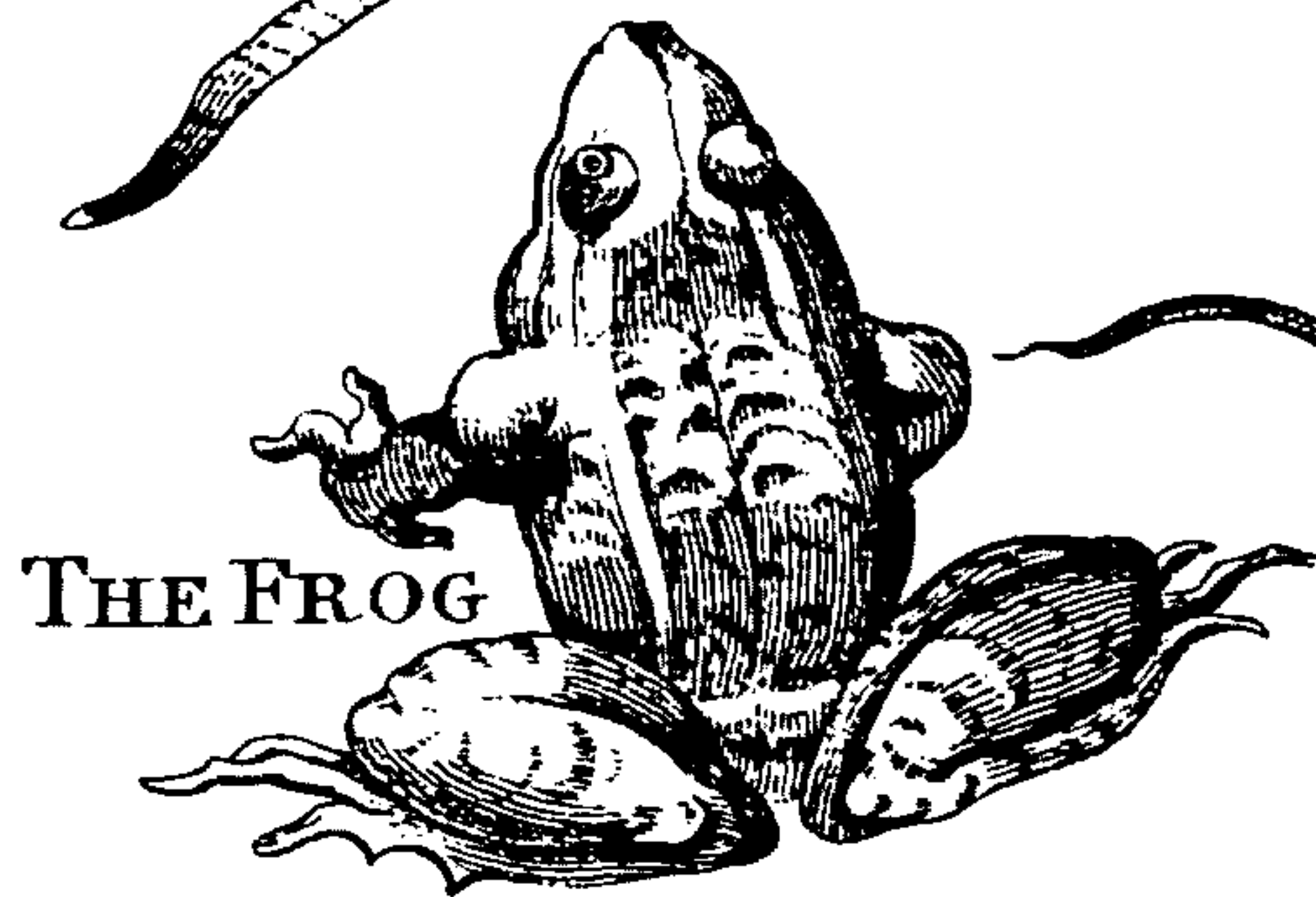
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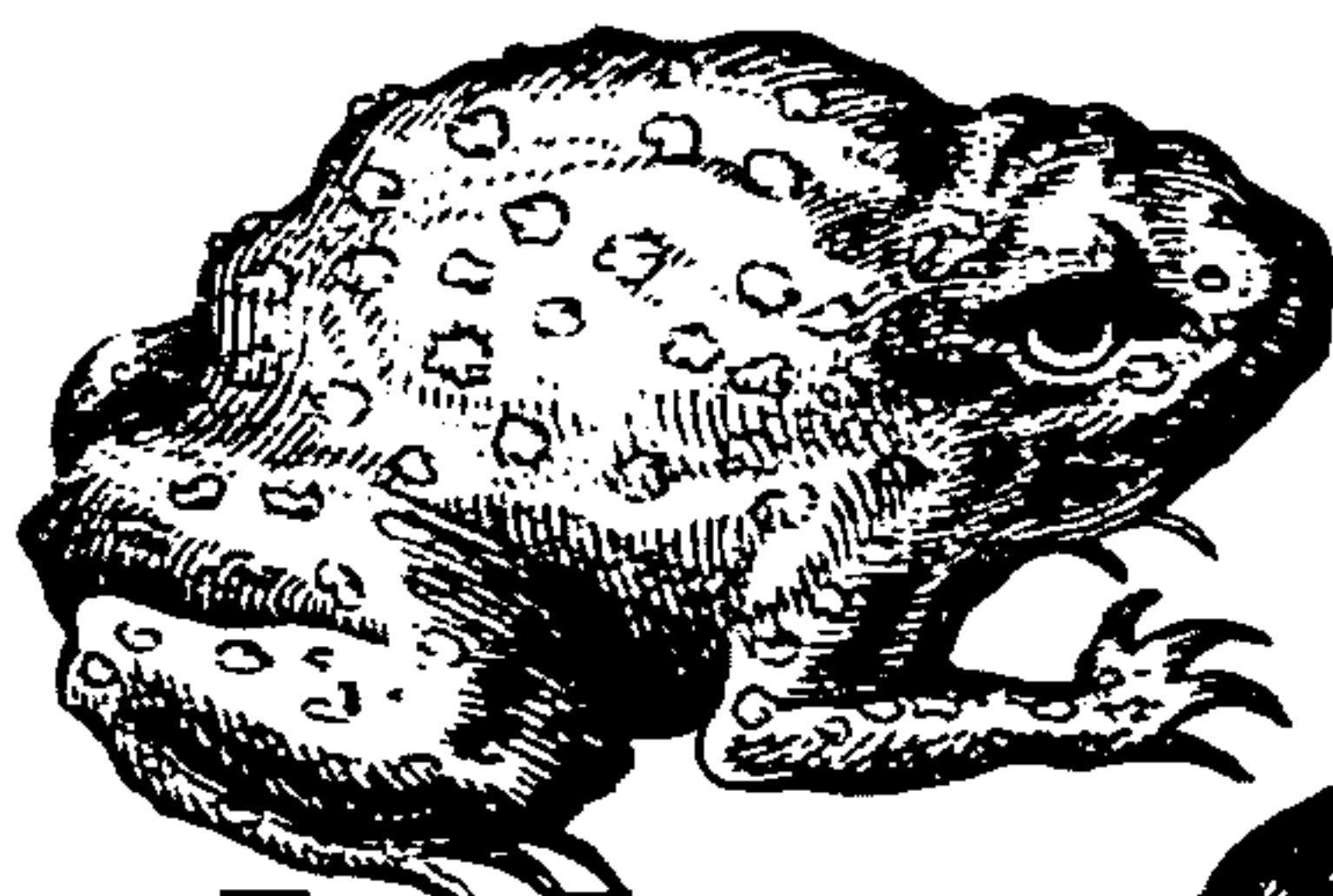
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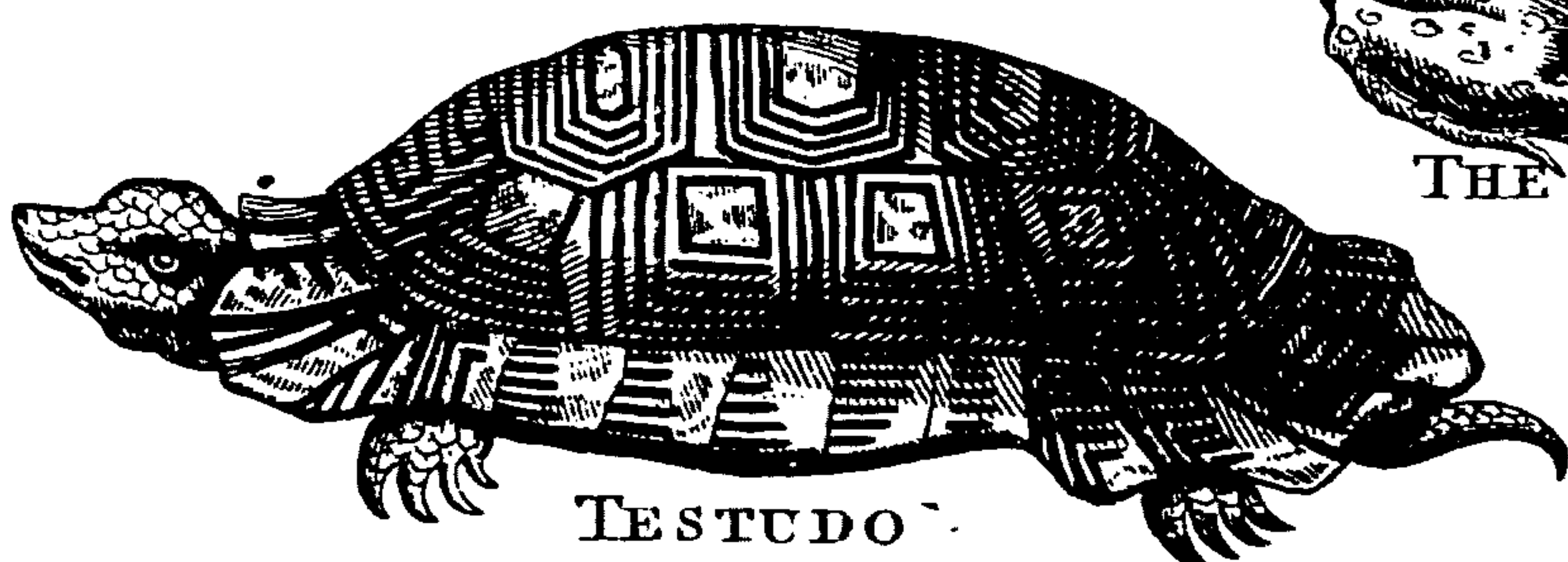
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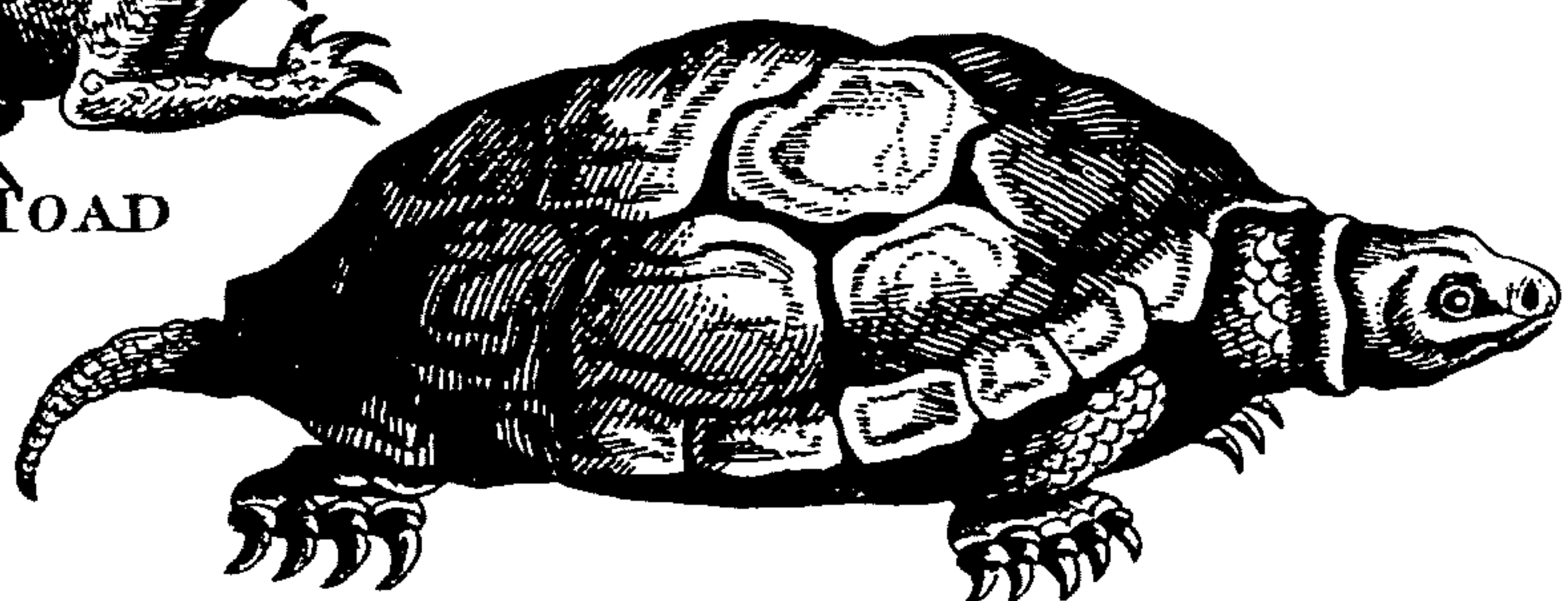
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THE TOAD



TESTUDO



TESTUDO

upon its prey: the little animal is incapable of breaking through the fascination, it advances towards the serpent with seeming reluctance; at length, as if overcome by the potency of its fears, it jumps into the throat of its frightful destroyer.

The *whip-snake* is still more venomous than the rattle-snake. It is a native of the East, and is about five feet in length, though it is not much thicker than the thong of a coachman's whip; from whence it has its name.

The *asp* is also a very formidable serpent, but its bite is not attended with those drowsy symptoms which the antients ascribed to it.

The *jaculus* of Jamaica is one of the swiftest of the serpent kind.

The *seps* inflicts a very venomous wound, and causes the part affected to corrupt in a very short time.

The *coral* serpent is red, and its wound is said to be fatal.

The *cobra di capello*, or *hooded serpent*, inflicts the most deadly and incurable wounds: there are five or six different kinds of this formidable creature, which are all equally dangerous; a speedy death being the certain consequence of their bite. It is said the patient will die in about an hour after the wound is given; the whole frame being dissolved into one putrid mass of corruption. This animal is from three to eight feet long, with two large fangs hanging out of the upper jaw.

NATURAL HISTORY of the SNAKE.

THIS is the largest of the English serpents, and is sometimes found upwards of four feet in length: the neck is slender; the middle of the body thick; the back and sides covered with small scales; the belly with oblong narrow transverse plates. The back and sides of the Snake are of a dusky brown: on the middle of the back are two rows of small black spots, extending from the head to the tail; and the sides are crossed with multitudes of lines consisting of spots. The plates on the belly are

dusky; the scales on the sides are of a blueish white. The teeth are small and serrated, lying on each side of the jaw in two rows. This species has a spot of pale yellow on each side of the neck; it is perfectly inoffensive, taking shelter in dunghills, and among bushes in moist places. It will readily take the water, and swims very well, its whole length generally appearing on the surface of the water. In summer the Snake is invited out by heat to bask itself in the sun. If disturbed, they move swiftly away among the brambles; and, if too closely pursued, will hiss and threaten, and though incapable of offending, will thus render themselves formidable. The Snake preys upon frogs, insects, worms, and mice. During winter it lies torpid under old trees, or in the banks of hedges.

NATURAL HISTORY of the BLIND WORM.

LIKE the snake, the Blind Worm is a very inoffensive reptile, with a formidable appearance. The usual length of this species is about eleven inches; the iris of the eye is red, the head small, the neck very slender; the body grows suddenly from the neck, and continues of an equal bulk to the tail, which is blunt at the end. The back is ash coloured, marked with very small lines composed of minute black specks; the sides are reddish and the belly dusky, marked in the same manner as the back. This serpent is slow in its motions, on which account, (together with the smallness of its eyes) it obtained its names: some calling it the *slow*, and others the *blind* worm. Like other serpents in our climates, it lies torpid during winter, and many of them are sometimes found twisted together. Like the viper this animal brings forth its young alive. Dr. Borlase mentions a Blind Worm with a pointed tail, by the bite of which a man lost his life. It is probable that the dusky viper was mistaken for one of this kind; for it is generally agreed that the viper is the only poisonous serpent in these kingdoms.

C H A P. II.

Containing the NATURAL HISTORY of INSECTS in GENERAL, viz. the SPIDER, the TARANTULA, the FLEA, the LOUSE, the BUG, the WOOD-LOUSE, the SCORPION, the SCOLOPENDRA and GALLY WORM, the LEACH, the LIBELLA, the ANT-LION, the GRASSHOPPER and LOCUST, the CRICKET, the EARWIG, the EPHEMERA, the CATERPILLAR, BUTTERFLY, and MOTH, the SILKWORM, the BEE, the WASP and HORNET, the ICHNUMON FLY, the ANT, the BEETLE, the GNAT and TIPULA, the WORM and its Kind, the STAR-FISH, the POLIPUS, the CORAL PLANTS, and all the Varieties of the SEA-NETTLE.

INSECTS may be defined to be little animals without red blood, bones, or cartilages, furnished either with a trunk, or a mouth opening lengthwise, with eyes which they are incapable of covering, and with lungs which have their openings on the sides. The whole class of insects is comprehended in this definition.

Swammerdam, Reaumur, and Linnæus, have each endeavoured to abridge the task of description, by throwing a number of similar animals into distinct classes, and thus making one general history answer for all. We shall, in some degree, follow their example, and throw the whole class of insects into four separate distributions.

The first which offer themselves are those which are destitute of wings, that appear crawling about on plants or on the earth. Some of these never obtain wings, but creep on the vegetable, or the spot of earth where they are stationed for their whole lives. Others indeed are candidates for a happier situation, and only wait for the growing of their wings, when they may be said to arrive at their state of full perfection. Those which remain without wings, may be considered as constituting the first class of insects. All these are produced from an egg, the flea and the wood-louse only excepted; and after they are excluded from the shell, they never suffer any further change of form; thus the louse and the spider are produced

produced from an egg; and, therefore, like the chicken or the duck, remain entirely the same from their birth to their dissolution.

The second order of Insects are composed of such as have wings, but their wings are cased up in such a manner as not to appear, when produced from the egg. These animals, however, are not prevented by the casing up of the wing, from running, leaping, and moving with its usual celerity; but, when the case bursts, the wings expand, all the creature's motions become more extensive, and it arrives at full perfection. The grasshopper, the dragon-fly, and the ear-wig, have their wings at first bound down; but when the skin bursts, they are expanded, and the animal pursues the purposes for which it was produced.

The moth or butterfly kind form the third order of Insects. These have four wings, covered with a mealy substance of various colours, which comes off upon the fingers when they are handled. These are produced in a manner peculiar to themselves. They are first hatched from an egg, from whence proceeds a caterpillar that eats, and often casts its skin: at length it assumes a new covering, which is called a chrysalis, in which it remains concealed, till it comes forth a moth or butterfly.

The fourth order of Insects consists of such as have wings, which come from a worm instead of a caterpillar, and pass through changes similar to those of moths and butterflies. They are excluded from the egg as a worm, and then become a chrysalis: at length they burst their prison, and come out perfect animals, some being furnished with two, and others with four wings. These wings, however, are very different from those of the butterfly and moth kind, as they have none of those mealy particles which are always to be found on the wings of the former. The numerous tribe of gnats, beetles, bees, and flies, are comprehended in this class.

As a fifth order may be added a numerous tribe lately discovered, called zoophytes by the naturalists. These do not go through the ordinary forms of generation, but may be propagated by dissection. If some are cut into an hundred parts, each part retains life, and is endued with such a vivacious principle, that it will in a short time become a perfect animal. To this class belong the polypus, the earth-worm, and all the varieties of the sea-nettle.

NATURAL HISTORY of the SPIDER.

THE most subtle of all insects is the Spider. Formed for a life of rapacity, all its habits are calculated to deceive and surprize. In this island, where all the insect tribes are kept under by human assiduity, the Spiders are small and inoffensive. The chief of our native Spiders are the *house* Spider, which weaves its web in neglected rooms; the *garden* Spider, which extends its web from tree to tree, and reposes in the center; the *wandering* Spider, that has no fixed abode, and the *field* Spider, which sometimes mounts web and all into the clouds. These are all reputed venomous, but they are perfectly harmless. In Africa and America, the tribe of Spiders are much more terrible. The bottom of a Martinico Spider's body is as large as a hen's egg, and covered with hair; its web is strong, and its bite is dangerous. We are happily placed at a distance from these formidable creatures, and are satisfied with the history of them, without wishing to approach them.

Every Spider has two divisions in its body: the fore part contains the head and the breast, and is separated from the belly, or hinder part, by a very slender thread, which however forms a connection between the two parts. The fore part is furnished

with a hard shell, as well as the legs, which adhere to the breast. They have brilliant eyes all round the head; some are possessed of eight, and others only six; two are placed before, two behind, and the rest on each side. As these animals procure their subsistence by the most watchful attention, so many eyes are necessary to give it the earliest information of the capture of its prey. On the fore part of the head they have two pincers, strong pointed, and serrated, and terminating in claws. A small hole is seen below the point of the claw, through which it emits a poison, which, though harmless to us, instantly destroys their prey. They have all eight legs, jointed like those of lobsters, and, like them, if a joint is lost, they are quickly supplied with a new one. Besides the eight legs already mentioned, Spiders are furnished with two others, which may not improperly be called arms, as they do not serve to assist motion, but are used in managing their prey.

As the Spider lives wholly upon flies, and is destitute of wings to pursue them, it becomes an experienced hunter, and spreads a net to catch those animals it is unable to pursue. Its web is generally laid in those places where flies usually resort: there it remains in patient expectation for days and weeks together, seldom changing its situation.

To fabricate this web, Nature has supplied the Spider with a large quantity of glutinous matter within its body, and five teats for spinning it into thread. The threads which we see spun from these teats, and which appear so fine, are nevertheless composed of five joined together, and these are many times doubled when the web is in formation.

The female Spider generally lays from nine hundred to a thousand eggs in a season; they are of a bluish colour, speckled with black, and are large or small, in proportion to the size of the animal that produces them. An hour or two after the exclusion of the eggs, the female prepares to make them a bag, where they are to be hatched. For this purpose she spins a web much stronger than that made for catching flies, and lines it with a down which she plucks from her own breast. Within this she deposits the eggs, and sticks it to the end of her body, by means of her glutinous fluid: thus loaded, the animal appears as if she had one body placed behind another, and this treasure she seldom abandons but with her life.

When the young are excluded from their shells, the female bites open their prison, and sets them free; she then receives them upon her back, till they have strength to provide for themselves.

Of this animal there are several slightly differing from each other, either in habits or conformation, but varying considerably in size. The *Bermudas* Spiders are of a very large kind. The *streaked* Spider is speckled with black all over its body and legs. The *Carter*, or long-legged Spider, has legs of an extraordinary length, and there is no distinction of the back and belly part; for the whole body appears to be nearly round.

NATURAL HISTORY of the TARANTULA.

THIS animal has some resemblance to the house spider; but is the largest yet known in Europe. It is a native of that part of Italy, called Apulia. The body is about three quarters of an inch in length, and about the thickness of a man's little finger: it is generally of an olive brown, variegated with a dusky colour: it has eight legs, eight eyes, and sharp nippers: between these and the fore legs, there are two little horns or feelers, which it moves very briskly when it approaches its prey.

Its body is covered with a kind of soft down, and it propagates, like other spiders, by laying eggs. In the summer month, the Tarantula creeps along the corn, and bites the passengers and mowers; but in winter it lurks in holes, and is very seldom seen. Though the bite of this animal is attended with no dangerous symptoms, and will easily cure of itself, wonderful stories are reported concerning its virulence. The person bit, it is said, does nothing but laugh, dance and skip about, putting himself into the most extravagant postures; this is succeeded by a most frightful melancholy, and at length the symptoms terminate in death. Some travellers into Italy affirm, that this extraordinary malady is only to be cured by music, and particularly by the violin. The medical musician begins with a particular tune, celebrated for the cure: the patient begins to dance, and continues dancing, till he is all over in a strong perspiration, which forces out the venom that appeared so dangerous. Swammerdam, however, assures us, that even in Apulia, this story is looked upon as entirely fabulous, and is kept up as a vulgar error by some strolling musicians, who obtain a livelihood by playing the supposed venom away.

NATURAL HISTORY of the FLEA.

VERY few are ignorant of the agility and blood-thirsty disposition of the Flea. It is not only the enemy of mankind, but of the dog, cat, and several other animals, and is found in every part of the world. The Flea has a small head, large eyes, and a roundish body. It has feelers, or horns, which are short, and composed of four joints; between which its trunk is situated, which it buries in the skin, and through which it sucks the blood in large quantities. When beheld through a microscope, it appears to be curiously adorned with a suit of polished sable armour, elegantly jointed, and beset with great numbers of sharp pins, resembling the quills of a porcupine. It has a piercing round black eye: it is furnished with six legs, which are so contrived, that it can fold them up one within another, and, when it leaps, they all spring out at once; whereby its whole strength is exerted, and it can raise itself to an extraordinary height.

NATURAL HISTORY of the LOUSE.

THE Louse is the enemy of man in the most odious degree; for whether wretchedness, disease, or hunger seize upon him, the Louse seldom fails to add itself to the tribe, and to increase in proportion to the number of his calamities. In examining the Louse with a microscope, its external deformity strikes us with disgust; but as the learned and elaborate Dr. Swammerdam has given us a very minute description of this insect, we cannot withhold it from our readers, though we wish it had been less scientific and less prolix. It is, however, exceedingly curious and entertaining.

"Before I exhibit," says he, "the internal parts visible in this small and despised animal, I shall describe its external parts, and shall shew every thing remarkable in the head, thorax and abdomen. The shape of the fore part of the head is somewhat oblong, that of the hind part somewhat round; the skin is hard, and being stretched, is transparent like parchment, and has here and there bristly hairs. At the extremity of the fore part is the proboscis, or sucker, seldom visible, since it is always drawn to the inside; I shall therefore describe it when I come to the throat and stomach. On each side of the head are the antennæ, or horns, which are also covered with a skin like parchment. Each of these is divided into five joints, elegantly covered with bristly hair, and several white vessels are seen through these

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horns. Behind these are the eyes, which seem to want those hexagonal divisions observable in other insects, and they appear to be encompassed with some few hairs.

"The neck is very short, the breast is divided, as it were, into three parts; in the middle of which, on the back-side, appears, as it were a small shield. On each side are placed six legs, each of which consists of six joints, some larger than others: they are very delicately adorned with bristly hairs, and many whitish vessels are seen through them. The ends of their legs are armed with a smaller and larger ruddy and pellucid claws, serving these insects instead of a finger and thumb; for by the former they take hold of a person's hair, and by the latter, they are able to ascend, and run nimbly. Under, at, and upon the breast, where it is joined to the legs, and, as it were, in the very centre of it, there appears a short whitish groove or channel, which is conspicuous through the middle of the abdomen, appears of a brownish colour, and has very strong motions. On either side of this groove or channel are two bright little parts, like the larger before described, whose appendages they are, and which rise considerably on the inside of the breast, and are there also transparent.

"The abdomen is divided into six parts, and at the end of it, on the under part, the body terminates as it were in a cloven tail. Besides these in the middle of the lower part of the belly, there is to be observed a whitish spot like a point, which is also transparent, and moves distinctly up and down. On the sides and extremities of the belly, which is all over hairy, are observed some pellucid, ruddy, little bodies; and over the whole belly, a great number of white vessels are visible. The like are discernible in the back and breast. The skin of the abdomen is made like the ends of our fingers, consist of small grooves, but this structure does not hold through the whole, and not at all at the extremities of the abdomen; for there, as well as in the whole body, it is somewhat firm, like clear parchment, and when roughly pressed, it makes a noise and breaks.

"To obtain a perfect knowledge of all those parts, which I have hitherto mentioned in general, there is no other method than to dissect the creature. I shall therefore now give an exact description of all the minutiae relating to the internal parts; for by this means we shall have a complete idea of the external also.

"If we begin the dissection in the upper part of the abdomen, and cautiously open the skin there; blood immediately issues from the wound, and this being received into a small glass tube, and viewed with a powerful microscope, is seen to consist of transparent globules, as cow's milk: the same has been likewise discovered in the human blood for several years; it is found to consist of ruddy globules swimming in a clear liquor.

"It is, however, a matter of doubt, whether the blood in its vessels has any globules, for when drawn from them it may easily acquire that figure; this may at least be asserted of the ruddy part of the blood. I have therefore often resolved to put a small glass tube into the artery of a dog, and with a microscope to view the flowing blood. For thus, by analogy, it may be possible to determine with some certainty, whether the human blood, before it is taken out of its vessels, contains any globules. I am the more in doubt concerning this matter, because there are vessels discovered in the body, which appear much finer than the globules themselves visible in the blood. By this means also may be known the true difference between the arterial and venal blood; for in the latter only, I have hitherto observed these globules, having never examined the former: nor shall

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I positively assert, that there are original globules in the Louse's blood, for they may be easily formed by the intermixture of the blood with the fat, and some wounded particles of the viscera or bowels, which consist of a congeries, or heap, as it were, of globular parts; as I shall shew in its proper place. Wherefore, more time ought to be spent in this anatomy, than I can devote to it at present, being engaged in many other studies.

"Immediately under the skin are certain muscular fibres, which move the annular divisions of the abdomen. I have observed three distinct kinds of these muscles, some a little broader, others narrower, and a third sort with two bodies. One may see that these muscles extend themselves from one annular division to another, and that some are much shorter than others. This little animal is very full of muscles, particularly at the extremities of the abdomen; since the motion is strongest in that place, and the respiratory points, or orifices for respiration are placed there; by the assistance of which the Louse takes in the air, and by a manifest act of inspiration and expiration, draws it into the body, and again discharges it. When these muscles are drawn from the body, they seem as if they consisted of but one fibre, but if they are dried upon a thin and clear glass, and washed with spirits of wine, which takes off the impure fat that adheres to them, their fibres and joints appear distinctly to be made up of globules.

"Under these muscles the fat and the trachea, or air vessels, come in view; nor could I ever hitherto discover any vestige of a heart in this upper part of the abdomen, as is usual in other insects, wherein the heart is always placed in this upper part of the abdomen and back; but I found clearly by this dissection that the Louse otherwise agrees in all its parts with other insects, as will hereafter plainly appear; therefore I have more diligently sought for the heart, but in vain: this may probably be owing to its extreme smallness, since it is very difficult to find it in the larger insects, as in the house-fly. There is also another impediment, which is, the strong and continual agitation of the stomach in this insect, being hardly a moment at rest; from which there arises an unavoidable inconvenience in investigating the heart.

"The particles which I take to be the fat of the Louse, are for the most part very small, but extremely numerous, though we may discover it in a larger species or kind of fat particles; the figure of the smallest kind of particles is usually globular, but that of the greater is more irregular. They are of a clear transparent colour, like jelly; but all the other parts of this animal are not of that colour.

"The ramifications of the trachea, aspera arteria, or wind-pipe, constitute the principal part of this insect; a very considerable number of them are found in the head, breast, belly, legs; nay, and in the antennæ or horns. We may likewise observe, that they are connected and supported by the fat, as I have found in other insects; and these are the white vessels, which are seen through the transparent body, as I have observed in the history of the external parts. The reason that these pulmonary pipes are seen through the skin, is, that they are of a silver colour, or light bright mother-of-pearl, and therefore afford a very agreeable sight, whilst the animal lives. They constantly keep this colour, nor will they ever fade, for their structure is such, that they remain always open.

"As to their composition, it consists of a double matter; a part is composed of rings, which resemble the cartilages of the trachea, or wind-pipe, in man. It appears very distinctly by the microscope, that these rings often bend themselves round, in or-

der to form a cavity and open pipe, but this does not happen so often as in other insects, because the rings of the Louse are shorter: they are also more curled and twined, in the likeness of a serpent, and seem every where interrupted. It may also be observed, that where the aspera arteria, or wind-pipe, is divided into branches, these rings are largest, but they are afterwards insensibly divided into smaller. The other part of these vessels is membranaceous, and is situated in the interstices of those rings; and by its assistance the rings may conveniently bend and turn themselves, as is known to happen, particularly in those wonderful motions of the stomach, which is surrounded by a great number of air-pipes.

"I have hitherto omitted examining whether these pulmonary pipes within the body, likewise shed a little skin at the time the Louse casts its coat, as I have observed to have happened in the bombyx, or silk-worm, and in almost all other insects. However, the smaller these pulmonary pipes are, the fewer rings they have, until at length they appear like more membranaceous threads.

"I may venture to affirm, that the pulmonary pipes cannot be more conveniently viewed in any species of animals that I have hitherto known, without dissection, so that we cannot contemplate their situation and course, with greater admiration, in any animal than in the Louse. But I have by me a very curious and famous apparatus, by the assistance of which, I can at any time demonstrate it with the greatest certainty.

"The orifices of the pulmonary pipes are seen in the outward skin of the Louse; one of which is on either side of the breast; and on each side, on the extremities of the abdomen are placed six. I have also thought I sometimes saw one pair of air orifices between the second and third pair of legs; however, I will not be positive in this matter. These orifices are the respiratory points, one of which is situated on one side, between the first and second pair of legs, and six on the extremity of the belly; these points swell a little there, like a small nipple, and in their circumference, seem to have a slight rim or border, which appears somewhat ruddy and transparent, as the place itself wherein they are fixed is also of a light red and bright colour; they are a little bent towards the inside, and immediately after the tegument of the extremity of the abdomen swells out. All the joints are like that which I have observed to be placed in the breast.

"From every respiratory point there issues a branch of the trachea, which soon after forms a visible anastomosis or inosculation with some branch of the trachea, that proceeds from another point, and both close into one canal: the same holds also in all the fourteen apertures of the lungs; so that the air, which is drawn into the body by one respiratory point, may be spread through the whole. Nor is it there only that the pulmonary pipes unite, but this holds equally in those which are in the back, belly, and breast; which last is distinguished by three manifest ramifications that are joined together underneath. This matter hath been already elegantly delineated by Dr. Hooke, in his incomparable micography; however, he could have no knowledge of these ramifications by any other means, but that they appear visible through the body.

"I am further instructed by the dissection, that the pulmonary pipes may be discovered not only in the head, breast, and abdomen, but they reach also to the intestines, the ovary, spinal marrow, brain, and, in fine, to all the internal parts of the body of this animal; all which, as I have distinctly seen, so I can demonstrate them to others, with the assistance of certain experiments which God enabled me to invent in the study of anatomy, that the miracles of

his works might be known: for we have not even the least thing from ourselves, for it is God that giveth us ingenuity.

"These things being well understood, I might proceed to describe the other parts, as first, the ovary, which appears next after the former, being a part placed upon the stomach itself: but since method requires us to treat, before these, of those parts which assist digestion, and tend to the nourishment and preservation of the body, and afterwards of those which serve for generation, I shall now describe the proboscis, or sucker, the throat, stomach, intestines, and other adjacent parts. I shall, after these, treat of the ovary, brain, and nerves, and then add something concerning the outward skin, with which I shall conclude this anatomical description.

"The Louse has neither beak, teeth, nor any kind of mouth, as Dr. Hooke described it, for the entrance into the gullet is absolutely closed: in the place of all these, it has a proboscis or trunk, or, as it may be otherwise called, a pointed and hollow aculeus or sucker, with which it pierces the skin, and sucks the human blood, taking it for its food into the body. But this proboscis cannot be shewn, on account of its extreme smallness; nor can it be distinguished, unless a person happens to see it by chance.

"At the extreme point of the head, when pressed out artificially, and with a particular attention, there appears an obtuse prominence, which being hollow in the middle of the inside, bends back into itself, and goes into the body, but has no aperture or opening. From this the proboscis, or sucker, is observed sometimes to proceed, and wherefore this part is, as it were, the sheath or case of it, wherein it is laid up.

"I cannot illustrate this structure or machinery by a more proper example, than by that of the horn of a snail, which is likewise turned into itself on the inside, and is again stretched out, but there is no perforation: wherefore, if the proboscis or sucker was placed at the end of it in this insect, instead of the real eye which we see in the snail, one might in some measure form an idea how the proboscis, or sucker, is wrought in this insect, and worked up with admirable art by the supreme architect of the universe.

"If the whole little sheath or case be afterwards examined, it is observable, that the upper end of it is thicker than the lower, and is swollen like a mushroom; so that it appears from hence, that the little foot on which it stands is smaller than its top. When one presses the proboscis, or sucker, and its sheath on the outside, we shall find that the end of the latter is absolutely blunt, and resembles the head of a pollard willow-tree, having all its branches cut off; we see also, that there are here and there certain pointed parts or claws in it, which, as well as the sheath, and the proboscis or sucker, are of a light brown colour, and are transparent. I shall presently shew the use of these claws; there is also a crooked proboscis or sucker in the middle of them. The outward skin of the sheath which is annexed to the proboscis, and from which its head is prominent, is of the same texture with the rest of the skin that covers the Louse; for it consists of grooves and pellucid globules, as I shall explain hereafter, when I treat of the skin.

"If we examine that part of a Louse's head at the time when it is seeking out some pore of sweat in the hand, wherein to fix its proboscis or sucker, a small line of a pale brown colour is then presented to us, which appears visible through the head, and has its fore part more deeply coloured. This little line is nothing else but the sheath itself, with the proboscis hidden in the inside.

"But before I explain the use of this proboscis or sucker, and its manner of rising, it seems necessary to describe the figure, situation, colour, texture, and motion of the gullet, stomach, and intestines; for thus the method, whereby the proboscis performs its suction, will be more easily understood. The œsophagus, or throat, is a very small canal, which one cannot see at any other time, but when the blood ascends through the proboscis, or sucker, into the mouth, and passes through this into the stomach. It is situated a little behind the eyes, and seems to be carried up above the brain: the reason that I think so is, because it appears there very clearly at the time of suction; so that it probably runs immediately under the skin of the head. In the neck it is somewhat enlarged, and afterwards it grows small again in the back, until it terminates in the stomach, near which I have observed it, like a very small, clear, and transparent thread, wherein a person that dissects it sometimes observes blood, and some other substance, which appears like the contents of the stomach. I discovered the whole gullet, in the action of sucking, as before described; for it is a very difficult matter to discover it in any other manner, because, in the upper part of the back, and also in the head and neck, it is very strongly connected with the adjacent parts.

"The stomach is lodged partly in the breast and back, but the greatest portion of them is in the abdomen. When swollen with blood, it appears of a dark brown colour, which is visible through the skin, and is either a faint red, or a full or bright brown, as the contents of the stomach are more or less changed. Where the stomach joins the breast above, its figure resembles a fork with two teeth; these are two hidden appendages of the stomach, which go deep into the breast, and on either side near the gullet and spinal marrow, and reach to the first pair of legs. These are those two blackish, transparent and coloured parts, which I have mentioned in general in the history of the external parts.

"The part of the stomach connected with the abdomen, deserves particular consideration; it is formed like an oblong bag, which is here and there continually contracted and again extended. When it is empty, it is colourless, and the stomach and its appendages are transparent. But as the stomach fills, the colour is seen plainly through the outward skin. It manifestly consists of two coats, the outward is thicker, the inner very thin, as it is in all insects. Nay, it is probable that it has three coats, and that the third is muscular.

"The outward coat of the stomach is furnished with so great a number of pulmonary pipes as can hardly be expressed in words. The longer branches are very conspicuous in it, but the smallest cannot be discovered, except by the assistance of the best microscopes. On the contrary, the inward coat is very thin; the third, which I suppose to be situated between the two former, comprehends, without doubt, the muscular fibres of the stomach, by the help of which it performs its wonderful motions. The coats of the stomach, especially the outmost, appear to consist of very many globular little grains, which are very irregular in form; but whether these little grains properly belong to the texture of the stomach, or whether they are rather particles of the fat, which cover the stomach, whereby the pulmonary pipes are gently moved, I could not well discern; only this I know, that the greatest part of them, when often touched, retire from the stomach.

"Underneath, in the abdomen, on a little rising, or prominence, nearly in the middle of the stomach, there is seen a certain little part, which Doctor Hook apprehends may be the liver; but I should rather take it to be the pancreas, or sweetbread, though

though there want sufficient arguments to prove it. Its colour is not properly whitish, but somewhat inclining to yellow; and it is so strongly connected with the stomach, that it cannot be easily separated from it. If this be laid before the microscope, it may easily be divided into many little grains, like glands, but these are not very transparent. When it is accurately viewed by the microscope, the pulmonary pipes also appear in it. The substance of this little part is more firm than that of the rest, for when it is extracted from the body and dried, it is but little diminished. It is of a very irregular figure, and is formed divers ways in almost every Louse, being sometimes greater and sometimes less; but it is always finished in the same general manner, by reason of its bendings and situation over the stomach.

"At the lower region of the stomach is seen the pylorus, and immediately from this, the intestinum tenue, or small gut, which is extended on each side, and formed like the stomach: this is also provided with a great many pulmonary pipes. At the end of this small gut, which is for the greatest part bent in a serpentine manner, or like the letter S, are discovered four small vessels, which the sagacious and excellent anatomist Marcellus Malpighius, has called the swollen vessels in silk-worms; but these are straighter and less inflected than the Louse; they are considerably long, and of the same texture with the intestines. These four little vessels are properly four intestina cæca, or blind guts, which I have found in all insects; wherefore, by inference, I call them here by this name, though I never have had the fortune to see their extremities. They open into the intestine, from whence they arise at the place just mentioned. After these appears the little intestine colon, and at the end of that, there is a manifest dilatation or extention, which is the cloaca, or place where the excrements acquire their figure; for they are very irregular, and not like those of other insects, which are usually formed in a singular and regular manner. Within this dilatation appears the intestinum rectum, which shews its aperture, as the anus situated upon the belly, between the division of the tail; and just under this the skin is very bristly.

"As to the motion of the stomach, it is truly admirable; inasmuch that one might suppose it an animal within an animal, by reason of the strong agitations, contractions, dilatations, corrugations, and expansions, all which belong to it, and strike one with amazement, the whole being plainly seen through the body. These appear plainly at the time when the stomach is full of food, but they are best of all seen, when the blood passes into it at the time of sucking; for then it is sometimes observed, that the remainder of the old aliment is mixed with the new, and is shaken and agitated up and down, and on every side, in the stomach. This may be seen the more distinctly, as the colour of the contents is more dark.

"Hence one may easily conceive what strange changes and emotions the pulmonary pipes on the stomach undergo at that time, and after what various ways the air contained in them is pressed, moved, propelled, and so purified; changed from its first nature, and rarified within the creature. But who can discover, by the most diligent researches, the use of the air in that place? surely no one. Yet, very wonderful motions are observed on this occasion, particularly in that little part which I called the pancreas, or sweet-bread; for this being connected with the stomach, must obey all its motions. These motions are continually repeated by turns, and undergo an infinite number of variations.

"As to the method whereby the Louse sucks the blood, and conveys that nourishment into the sto-

mach, it is performed thus, by the assistance of the proboscis, and its aculeus or point. First, if the Louse has abstained from food two or three days, it becomes very hungry, which is discoverable from the empty stomach, and because the creature is then wholly transparent; in this case, immediately as soon as he is placed on the hand, he seeks for food, which he will the sooner and more readily find, if the hand be first rubbed until it grows red. Then the Louse turns its head, which lies between the two fore legs, to the skin, and diligently searches for some pore of sweat: when he finds it, he fixes his aculeus or sucker therein; a little after this, the blood is observed, through the microscope, to ascend to the head, in a very rapid, and, as it were, frightful stream.

"The Louse has at that time matter enough to feed on in any pasture; for if it finds any hairs on the hand, by which it does not desire to descend, it stays in that pasture, and sucks with its head down, and its tail elevated. I have likewise observed, that it sometimes sucked with its belly upward, that is, when the hair it took hold of was bent down; and then the motion of the stomach, and pancreas, or sweet-bread, might be seen most beautifully by the help of a microscope.

"But I should think the principal use of the claws, which I have described to be situated at the end of the sheath or case of the aculeus or sucker, is to assist the creature in sucking, and that the aculeus serves for this purpose; for whilst these are strongly fixed in the superficies of the inner skin, and in the extremities of the pores, they enable the Louse to use its aculeus the more freely, and to move it at discretion, when the end of its sheath is placed firm and immoveable.

"Sometimes, whilst the Louse was sucking, I have strongly pulled the skin of my hand aside, that by this means the sheath, or rather its claws, together with the aculeus or sucker, might be bound fast in the skin, and the Louse could not disengage itself. This affords, indeed, a very agreeable sight. This I did with a design, that if I could thrust the Louse out of its place, I might the more plainly see the aculeus: but I could never accomplish my desire in this particular, though I had then almost wished to have three hands, that I might the better find what I wanted. There are some speculations and researches in anatomy that will not bear writing, since they almost distract the mind.

"When the Louse is employed in sucking, a very small rivulet of blood immediately appears behind the aculeus or sucker, which is seen through the transparent head. Between and before its eyes, on the middle of the head, there is observed also a considerable dilatation, for the jaws are there remarkably expanded, by the blood continually ascending. These parts are so swiftly contracted again, that there scarce remains the least sign of blood after a moment, and both are performed with such velocity, that the dilatation can hardly be distinguished from the contraction; wherefore I do not know how to explain this matter more properly, than by the sudden oscillation of the pendulum of a clock. Behind the eyes, a small rivulet of blood is likewise observed to run down within the head: this passage may be properly called the œsophagus or gullet, which lies behind the jaws, and grows wide again in the Louse's neck, as has been shewn before. I have chosen to exhibit all these as one continued canal, that my description may be the more clear.

"After the blood has ascended to the jaws, and comes to the gullet, we observe that it is immediately conveyed to the stomach, and that the bifurcated appendages, as well as the stomach itself, are at once filled with it. The motions of the stomach are then remarkably increased, its muscular parts being

being distended; for as these muscular parts are then stretched, they have an opportunity of contracting themselves again. Wherefore it is immediately observed, that the excrements in the large guts begin likewise to move; nay, it usually happens, that the Louse discharges them during the sucking.

"The food being thus received into the stomach, is agitated about in a wonderful manner; it is moved up and down, and by contractions and dilatations, which are not to be described, then performed by the stomach, is, as it were, sifted. After this, it is seen, that the contents first begin to divide into parts in the back, or hinder portion of the stomach, and they then appear like raisins preserved in jars, and are thus distributed through the body. However, this is a false appearance; it arises from hence, that the skin being divided into many grooves, is not equally transparent every where, and that some difference is in this respect seen through it, because the grooves are not equally transparent with the intermediate parts. Nay, the particles of the internal fat not being uniformly visible through the skin, and obscuring the brightness of the skin, conduce likewise to deceive the sight, as if the retreating blood entered into many peculiar vessels. To this may be added, that the blood has not at that time a homogeneous or equal colour, for its parts separate from each other. From these appearances, before I had accurately examined things, I thought that the blood was distributed out of the stomach, through various vessels, into the other parts of the body; but I afterwards observed that the phenomenon arose, as well from the blood itself, as from the different colours of the parts through which it was seen, and which I then took to be vessels. Perhaps others, especially Dr. Hooke, who first prejudiced me in favour of this opinion, have split on the same rock. I have not as yet made this experiment on the smallest Lice, in which more peculiarities may probably be seen, than in the larger kind.

"I have likewise resolved to receive the blood, when changed in the stomach, into a glass tube, and then to view it in the open air, or in some dark place by candle-light; but this I have not hitherto done, being hindered from making this, as well as many other experiments which I had a mind to try. In some hours after feeding, the contents of the stomach are observed to become insensibly more brown or blackish, and to diminish slowly; wherefore the intestines are afterwards seen to be more and more distended with excrements, which sometimes lie in them regularly divided, as it were, into globules. The reason of this is, that the intestines do not, at one and the same time, contract themselves about the fæces, and therefore they cast or extrude them out of the body at different times. I have already treated of the muscles of the abdomen in this insect, I shall now proceed to the parts of the breast.

"In this part, and in the back, are seen several muscles, which move the legs and head; and herein are also visible the appendages of the stomach, and a great number of pulmonary pipes and particles of fat. In the same view is also seen the gullet and spinal marrow, together with the nerves arising from thence, of which I shall now speak distinctly.

"In the middle of the back is seen a certain tendinous point, under the small shield there situated, where the skin does not appear to be so transparent as in the rest of the body. This shield seems there to be hollow, being thrust down into a little pit. At this point almost all the muscular fibres are seen to concur, and their motion and contraction are here very visible. As to the appendages of the stomach, and other parts of the breast and back, we have before treated of them at large.

No. 31.

"The spinal marrow is properly situated in the breast, and therein reaches to the insertion of the last pair of legs. When this is discovered, it is easy to judge what that short whitish groove is, which appears through the breast, between the appendages of the stomach; for these appendages are placed on both sides of the spinal marrow. The structure of the spinal marrow itself, does not differ much from that found in the worm, from which the *Scarabæus Nasicornis*, or Horned Beetle, by the ancients consecrated to Mercury, is produced, as is manifest from the history and figures of the latter. It consists of three remarkable swellings, expansions, or dilatations, from which, on either side, we observe three nerves to arise, which reach to the muscles of the six legs; but underneath, or in the hinder part of it, I distinguished six nerves issuing, which doubtless are distributed through the rest of the viscera, to give them life, sense, and motion. The lowest of those little knots, whereof the spinal marrow is composed, is formed in a different manner from the upper ones, which are alike. The membrane which covers the marrow is interwoven with a great many pulmonary pipes, and seems to be composed of irregular and globular little parts, in the same manner as we have shewn in respect of the coat and stomach; and this texture, together with the great number of pulmonary pipes belonging to the part, afford a very agreeable sight in the living insect.

"I could discover no fibres in the nerves, which arise from the posterior part of the marrow, though I viewed them fresh with the microscope; they seemed indeed to be made up of a homogeneous, bright and transparent matter, and at their sides were hung a great many pulmonary pipes, with particles of fat. The origin of the marrow, where it is connected with the brain, is seen like a fine thread. But in all other insects this beginning of the marrow is perforated, and through its aperture or cavity the gullet passes.

"The brain of the Louse is shaped like a pear, and is divided into a right and left part. The dura mater, surrounding it, is formed like the membrane which covers the marrow, and is provided with pulmonary pipes and particles of fat. I can very easily at any time shew the marrow, but the demonstration of the brain must be obtained rather by chance, than with any premeditated design or art; it is clearly seen, when by any accident it happens to be stript of the parts wherewith it is covered.

"The optic nerves are short, and the eyes, which are connected to them, are so small, that I could not dissect them to my satisfaction; as well because this operation is but awkwardly performed under microscopes, which magnify objects so much, that all instruments are too coarse for this purpose. Thus much, however, I distinctly saw, that this black part in the eyes might be separated or lifted up from them; which part in other insects I call the tunica uvea, not being situated at the bottom, but on the superficies of the eye; after this appears the tunica cornea; this seemed divided, as it were, into hexagons, as it is in other insects, though the other was not; but that I would not affirm for certain, for we are not to suppose or imagine, but to pursue by our senses, and discover the actions and productions of nature. This opinion, however, does not please some anatomists, who therefore esteem all comments on the brain merely as ingenious fancies. The younger Bartholinus, who, speaking of the fiction that silk-worms had no brain, expresses himself thus: "Behold, how many are pleased with their own blindness! who, altho' they are blind, and shall for ever remain so, yet cry aloud they can see, since these their contemptible works, which ought to be removed from their eyes, and buried in oblivion, are lasting monuments of their cloudy arrogance; for

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by this means they might afterwards seek for the light of the truth."

"Whether Lice are distinguished by the parts of generation, into males and females, as other insects are, I could not discover. Heretofore, indeed, I had sometime remarked, that Lice get upon each other; but this I could not observe while employed in this dissection. I found an ovary in every one of forty, which I dissected; this almost inclined me to think, that these little animals are hermaphrodites; and perhaps they really have in each animal the generative parts in the same body, as I have found in snails. Whether, indeed, it be so, is still a secret to me; for though I saw the ovary very distinctly, I could discover that only, notwithstanding the great hopes I had of finding it, from having observed, that all kinds of insects have very large organs of generation.

"The ovary is extended through the whole cavity of the abdomen, so that with its appendages it reaches even to the breast. It has an opening distinct from the end of the intestines, for as the upper part of the fundament is placed in the division of the tail, in which the abdomen ends; so, on the contrary, the vagina or mouth of the ovary opens into the lower part of the abdomen, where the body is divided, as it were, into two parts. The ends or extreme appendages of the oviduct, or egg-passage, are like two tubes, naturally joined in one point. In the oviduct are seen at once perfect eggs, and their rudiments or principles; so that in one ovary I have counted ten larger and forty-four smaller eggs, together making fifty-four. In the uterus I saw one perfect egg, which was fallen down ready for birth: at that time these little eggs are called nits.

"The ovary is double in all Lice, and every part of it is subdivided into five oviducts, which on each side end in one common canal; next comes in sight the uterus, in which the egg acquires its full perfection. Where the uterus ends, is seen a sacculus or bag full of a glutinous matter, opening in that part into the uterus; this is designed for fastening the eggs, whilst they are laying; the same may be likewise observed in many other insects, and particularly in bees. I must acknowledge that I have not seen the glutinous matter contained in this bag; but I infer, from the situation and structure of the part, that the bag was designed for keeping such a substance. After this appears the neck of the uterus, and therein is a small dilatation or expansion; by means of which, the ovary immediately opens itself into the outward womb.

"The oviducts embrace the eggs so closely, that scarce any difference is observed between them, nor can we separate the oviducts from the eggs, without great labour; when we do this, a great many bags of fat issue from thence, which obstruct the sight. It therefore has appeared to me, that the structure of the oviduct is the same with that of the stomach and intestines; though the texture of this part is nevertheless more delicate, and that the globular particles proceed from thence with greater ease, than in the other viscera. The oviducts are provided with many pulmonary pipes, of which, as we have already observed, this little animal has a very large number, though no bigger than a point; its structure and viscera, which excel all human art, the greatest geniuses ought to be amazed at, as I have here, though briefly, yet clearly explained and demonstrated. I am persuaded that I might make many more discoveries in it, if I had more time for that purpose, since I have completed this dissection, and discovered these remarkable miracles in this microcosm, or little world, in the space of six days. If the learned Daniel Heinsius had searched for these things in nature herself, and not in his own fancy, and in books, he would not have written so poor an encomium on this insect.

"As to the structure of the external skin of the Louse, it affords many particulars worthy of observation, nor is there any thing that bears a greater likeness to it, than stiff and transparent parchment: it is in several places marked with small grooves or channels, in the same manner as the ends of our fingers; which, when viewed with the best microscopes, really seem to be so many divisions of pulmonary pipes. But the lens of the microscope must, for this purpose, be carefully managed; for as it is turned one way or another, different things are seen: one cannot bring the lens nearer, or remove it further, by the least distance, but something is immediately perceived by the sight, which was not observed before. Globular particles, sometimes appear in the place of channels, or oblong pipes, though the eye is always fixed on the same part; then between the grooves themselves, where the skin is simply membranaceous, globular particles are likewise observed. In other places, as in the extremities of the abdomen, the structure of the skin is different; for there it seems to be composed, as it were, of irregular squares, wherein circular grooves may be seen in one part; in another globules; in a third, both globules and grooves, nay, sometimes the plain transparent skin only is seen full of points; all which, as we have before observed of the oblong grooves, are represented according to the transparency of the parts, which have not been yet totally separated from the inner surface of the skin; or just as the microscope is moved, somewhat nearer to, or farther from the skin."

NATURAL HISTORY of the BUG.

THIS also is a nauseous insect, which intrudes upon the retreats of mankind. The night is usually the season when the wretched have rest from their labour; but this seems the only season when the Bug issues from its retreats to make its depredations. It cunningly avoids the light; but when darkness promises it security, it issues from every corner of the bed, and greedily attacks its prey. Happily, however, for Great-Britain, they multiply less in that island, than in any part of the continent: in France and Italy the beds swarm with them; and in those countries they grow larger, and bite with a more cruel appetite than they do with us.

This animal consists of three principal parts; the head, the corselet, and the belly. It has two feelers, with three joints; beneath these there is a crooked trunk, which is its instrument of torture, and which lies close upon the breast when it is in motion: the breast is a kind of ring, and the belly consists of nine rings. It has six legs: its body is smooth, except that it has a few short hairs near the vent, which may be seen by the microscope: its motion is slow and unwieldy. The smell of this insect, when killed, is insupportable.

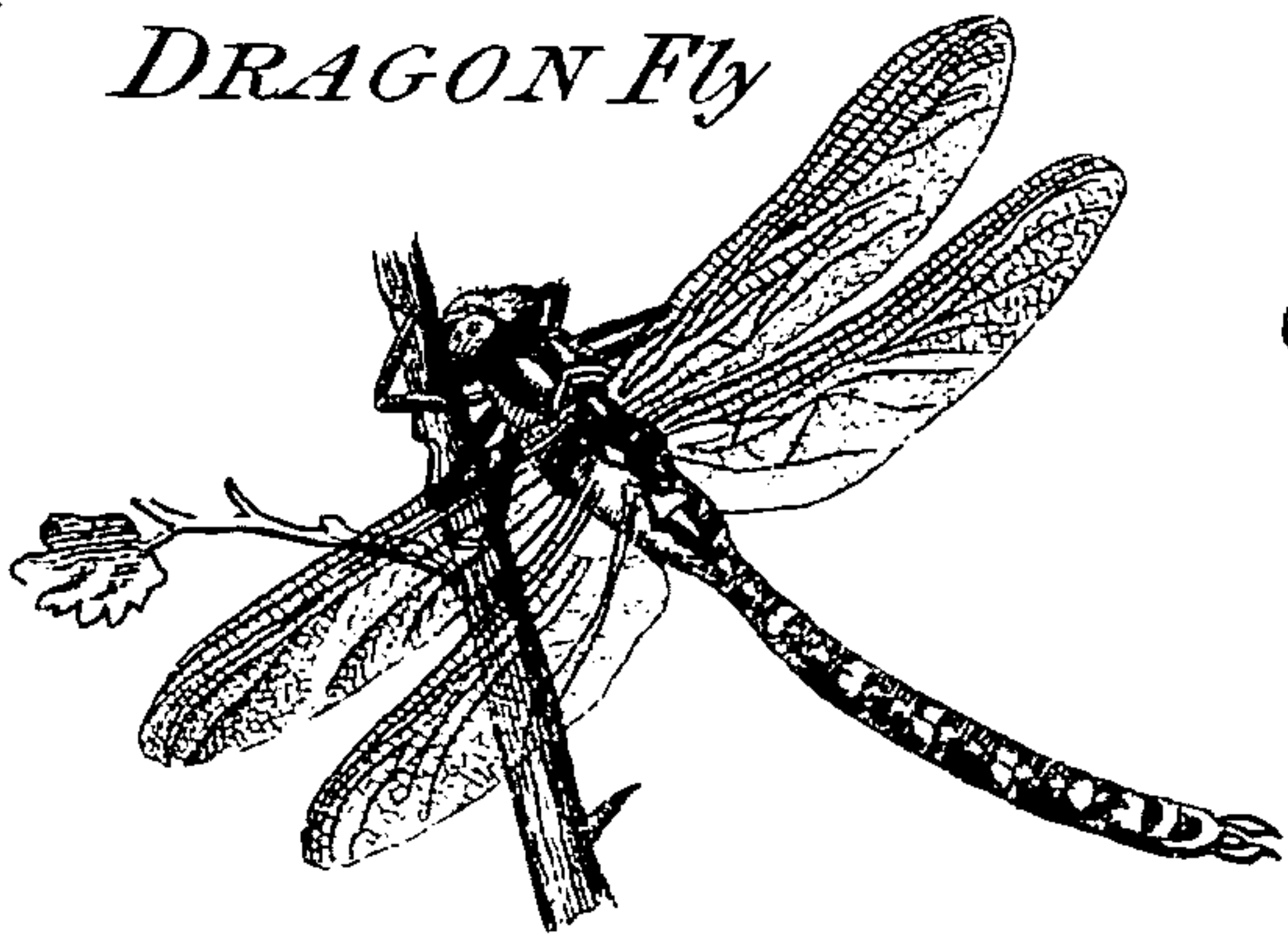
Linnaeus reckons up forty of the Bug kind; but the principal are the common Bug; the green and yellow Bug; the plant Bug; and the grass Bug.

NATURAL HISTORY of the WOOD-LOUSE.

THIS insect seldom exceeds half an inch in length, and a quarter of an inch in breadth. Those found about dunghills, and on the ground, are usually of a livid black; but those found under timber, tiles, and in drier places, are of a lighter colour. Of this insect Linnaeus makes three species; that with seventy feet on each side; that with fifty; and that with twenty: it has two short feelers, and the body is of an oval shape. When touched, it rolls itself up into a kind of ball; and the sides, near the

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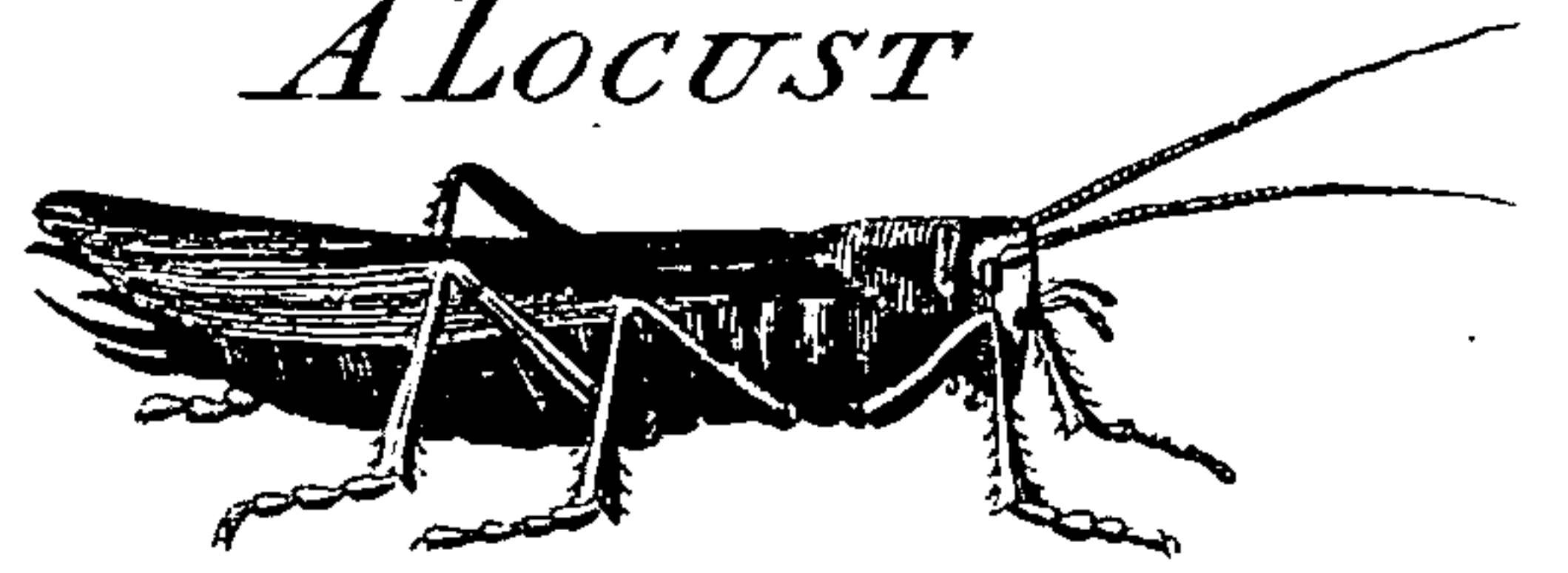
DRAGON Fly



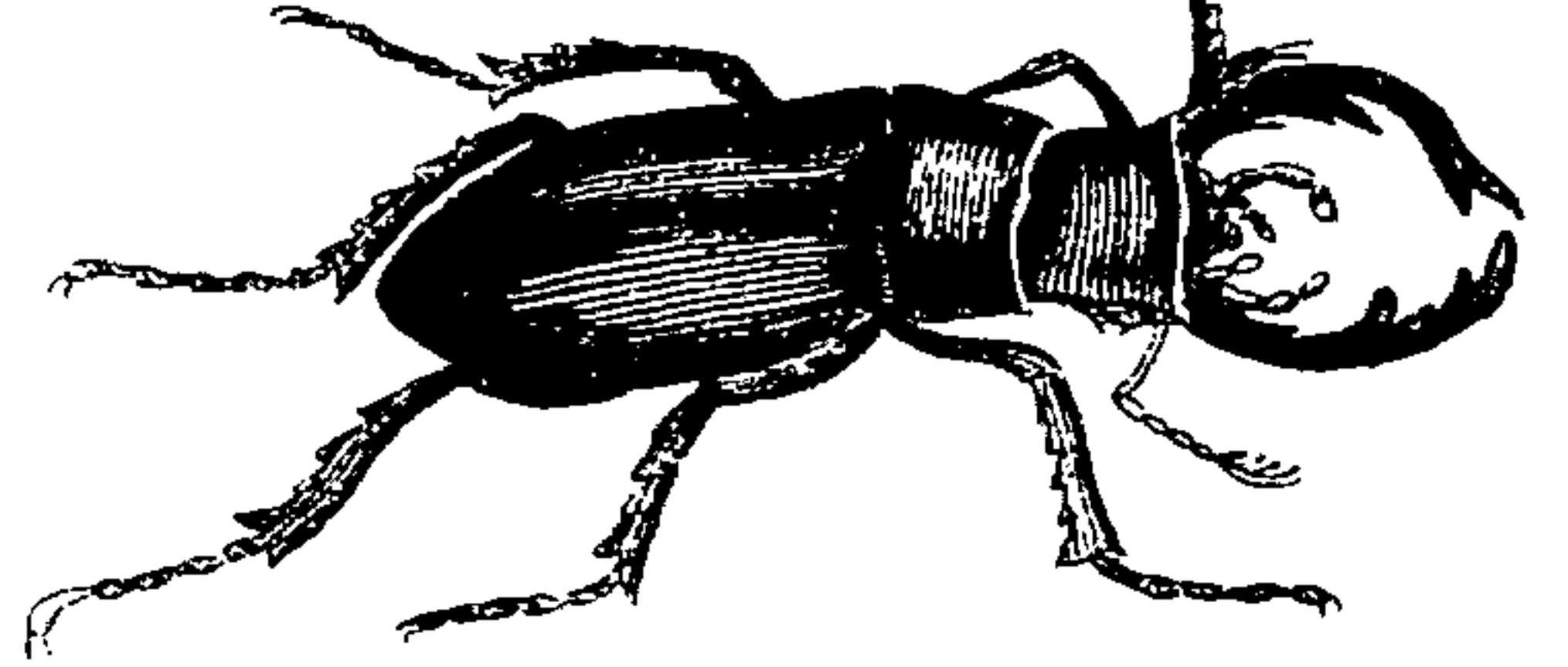
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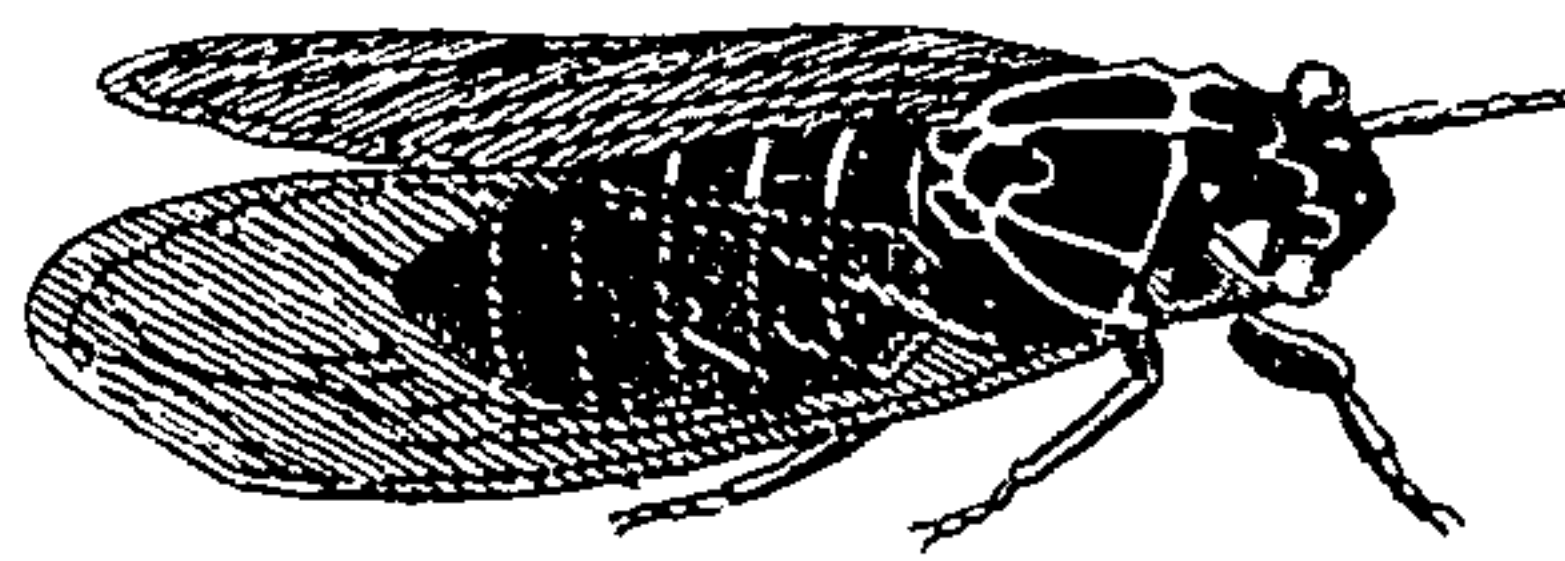
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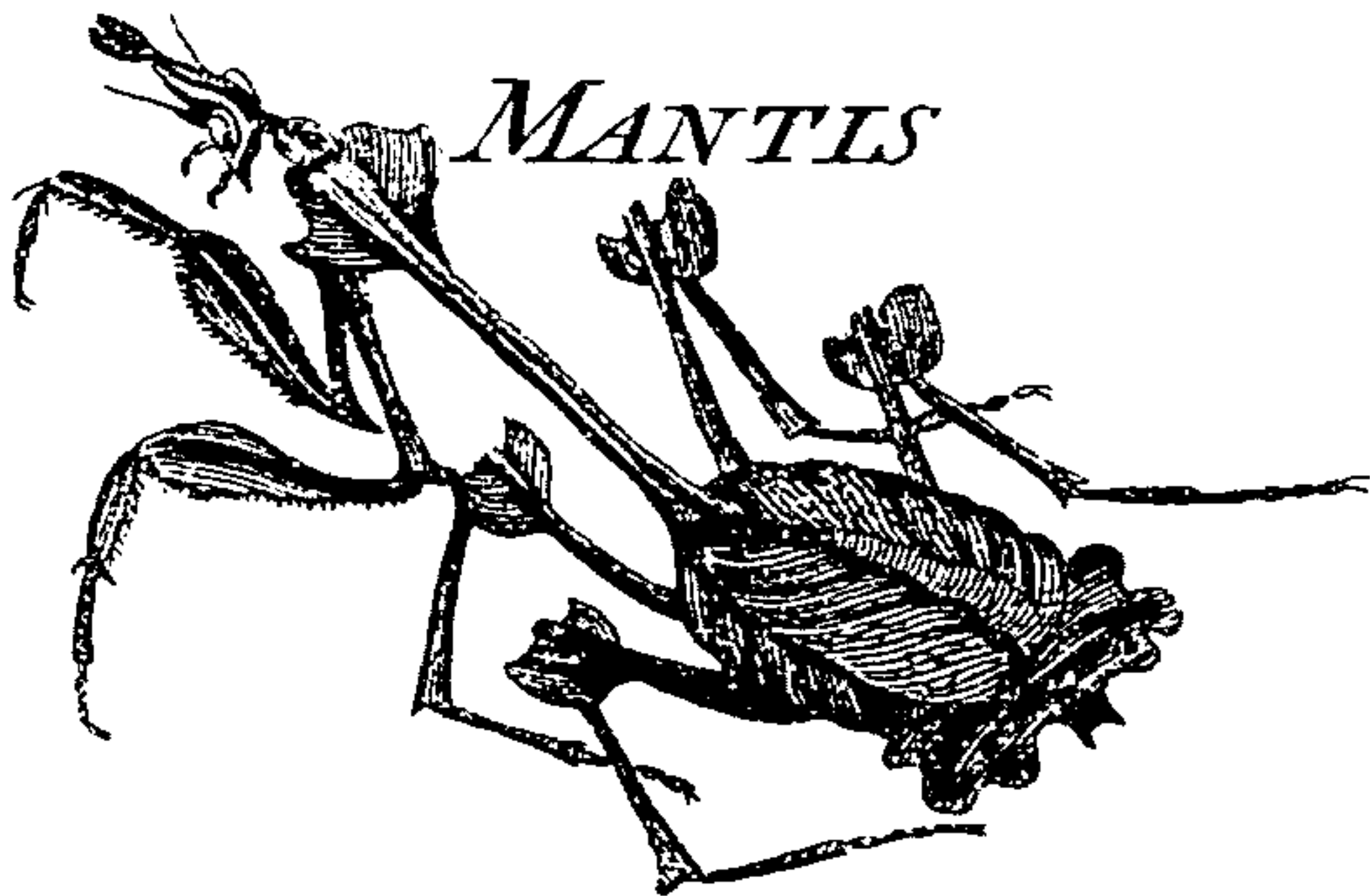
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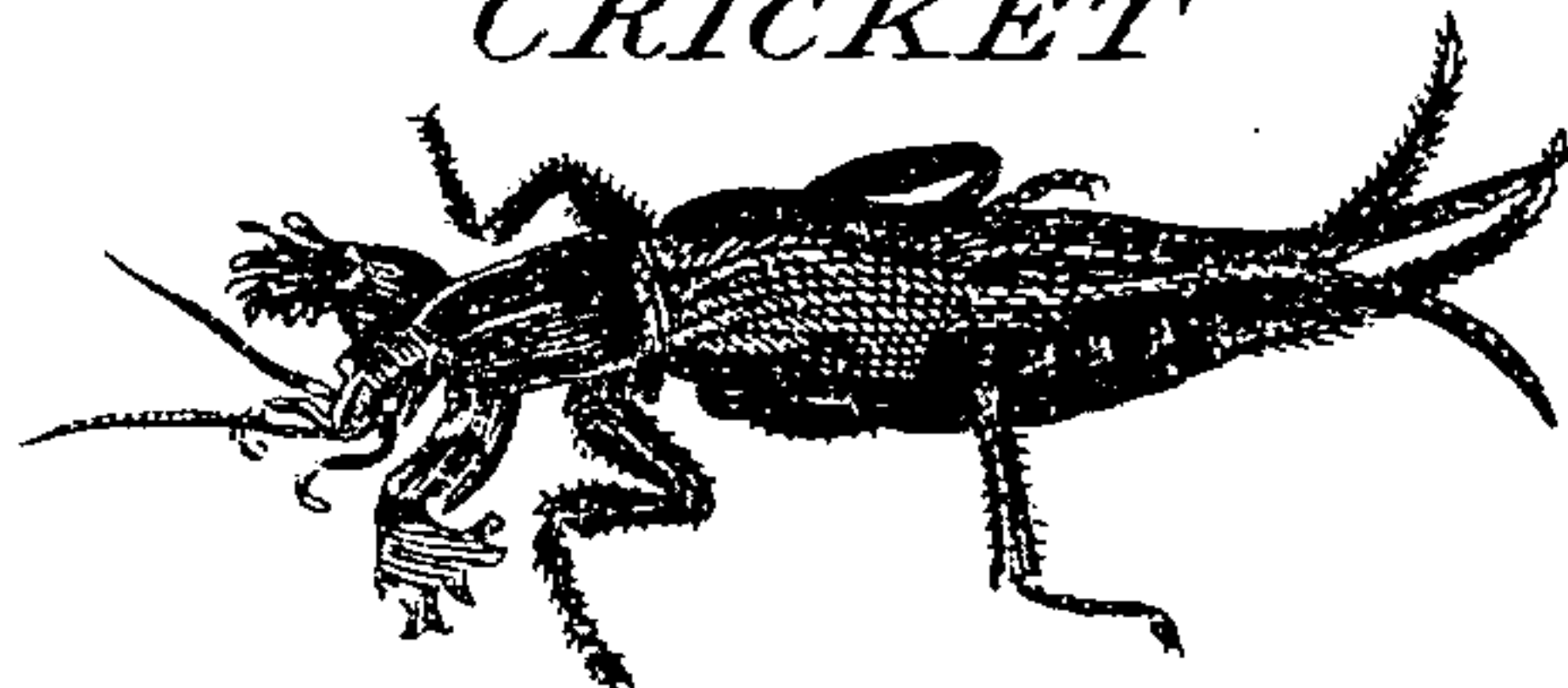
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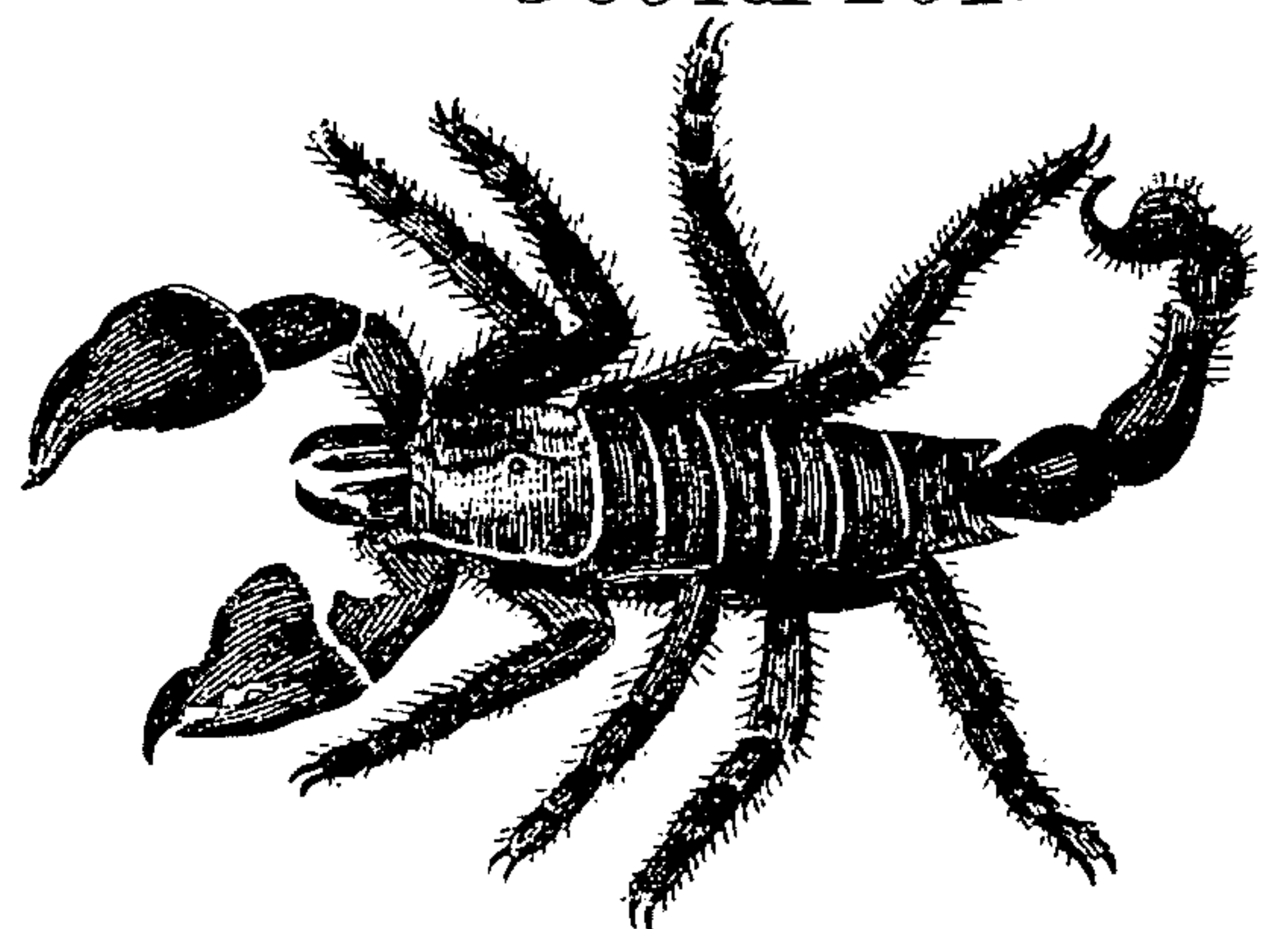
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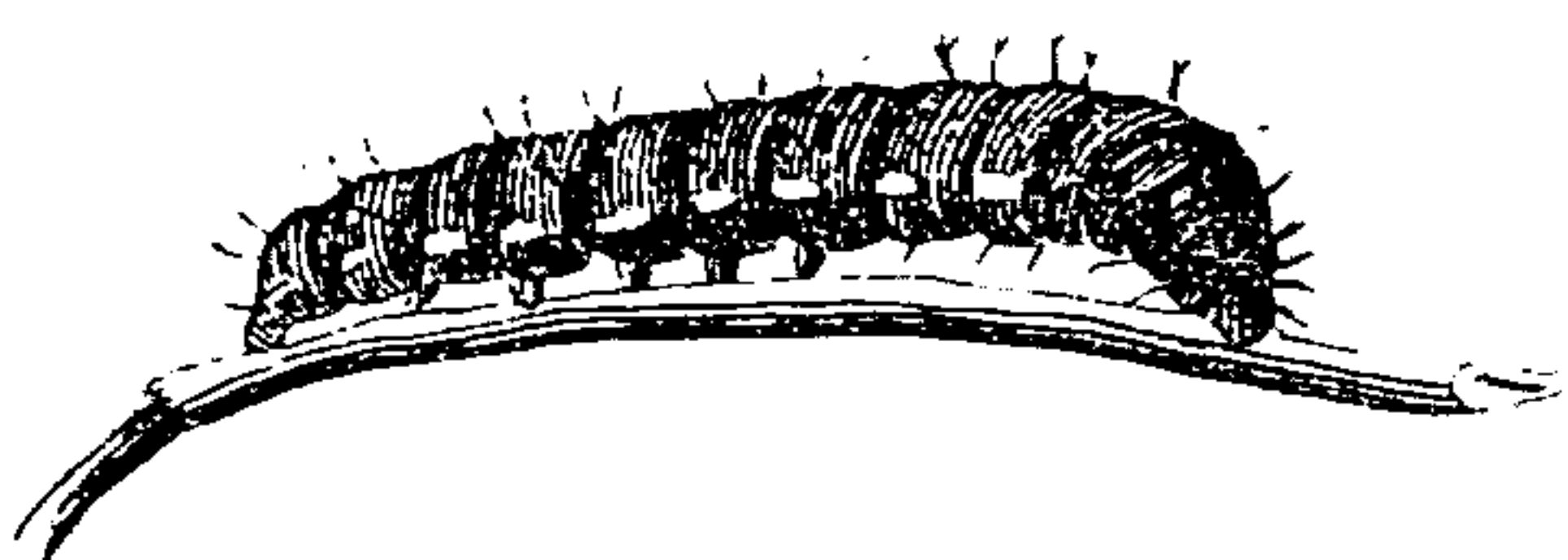
*Gryllotalpa, or Mole.
CRICKET*



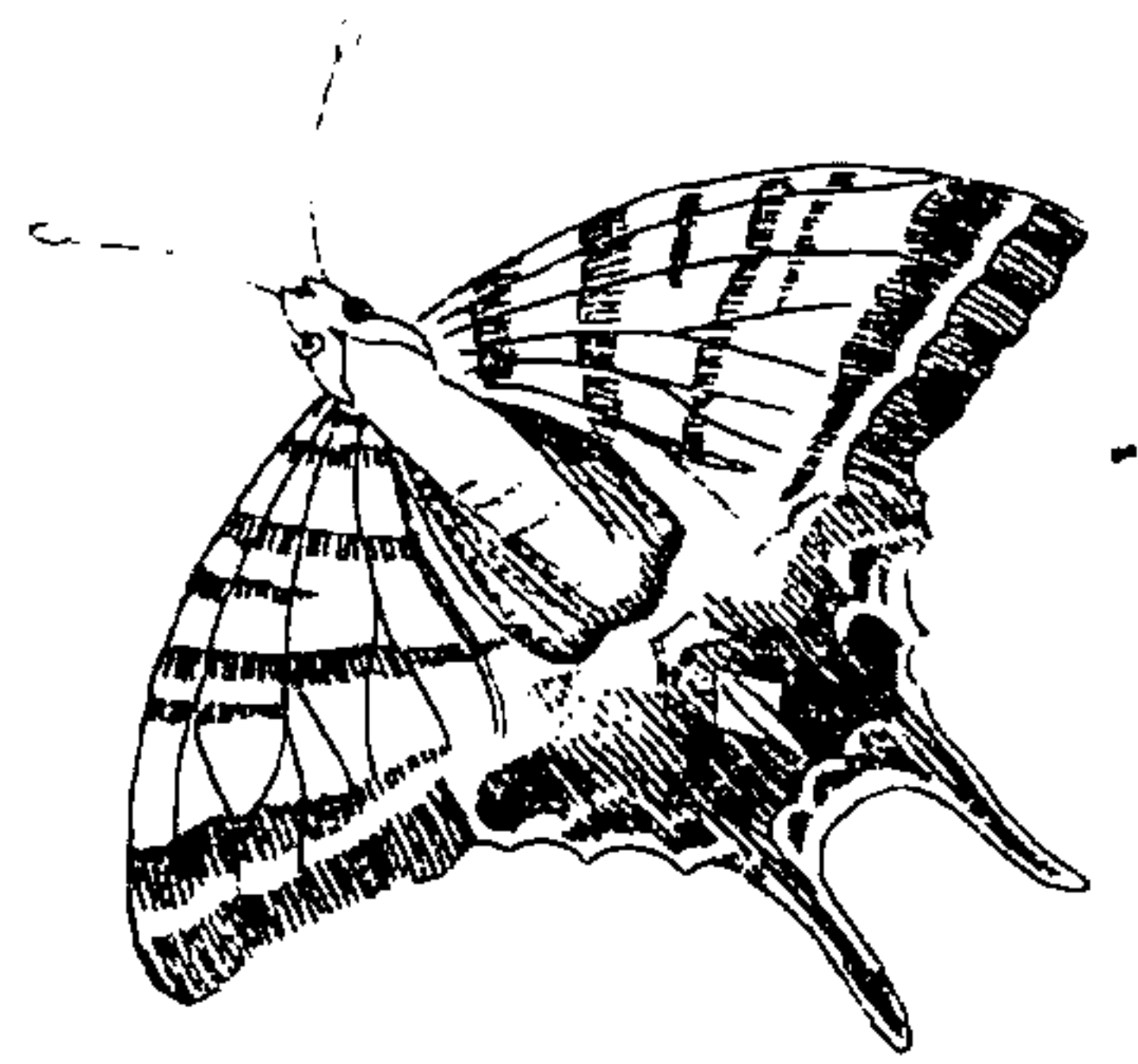
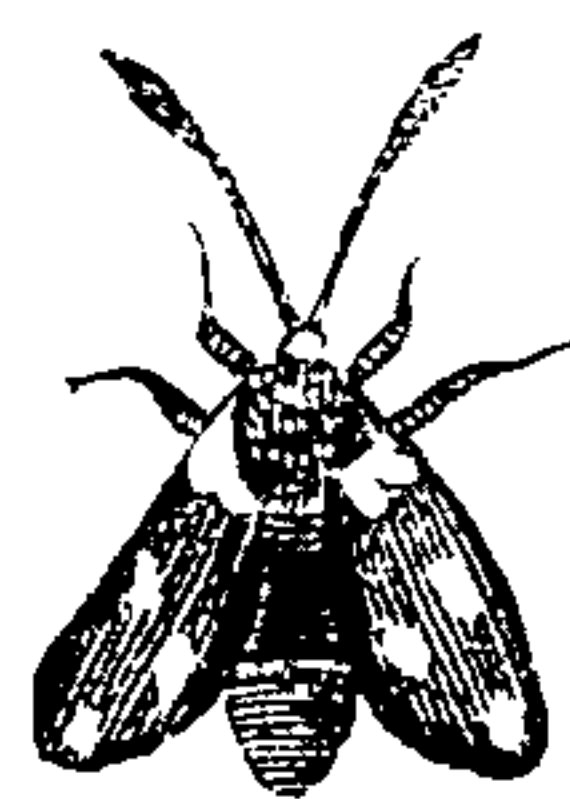
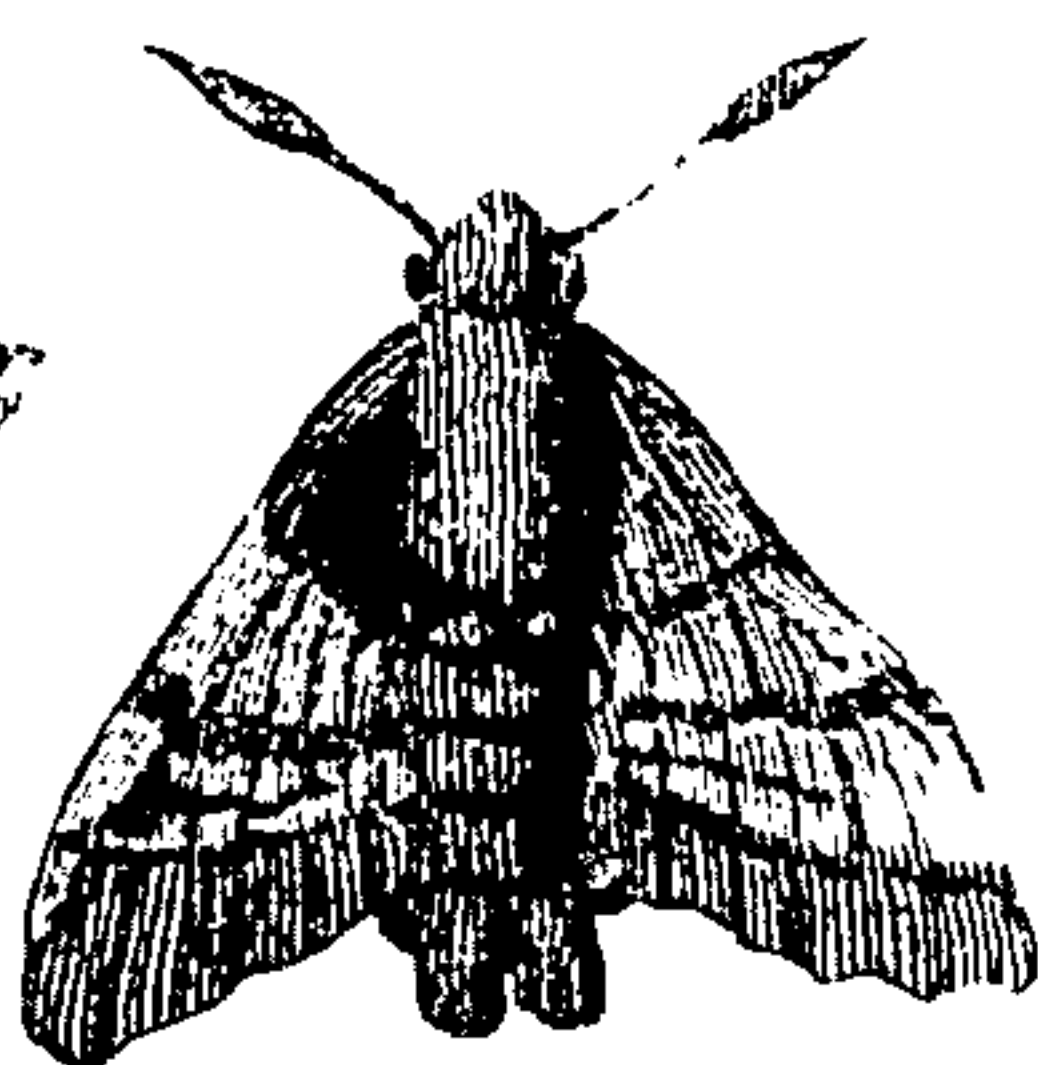
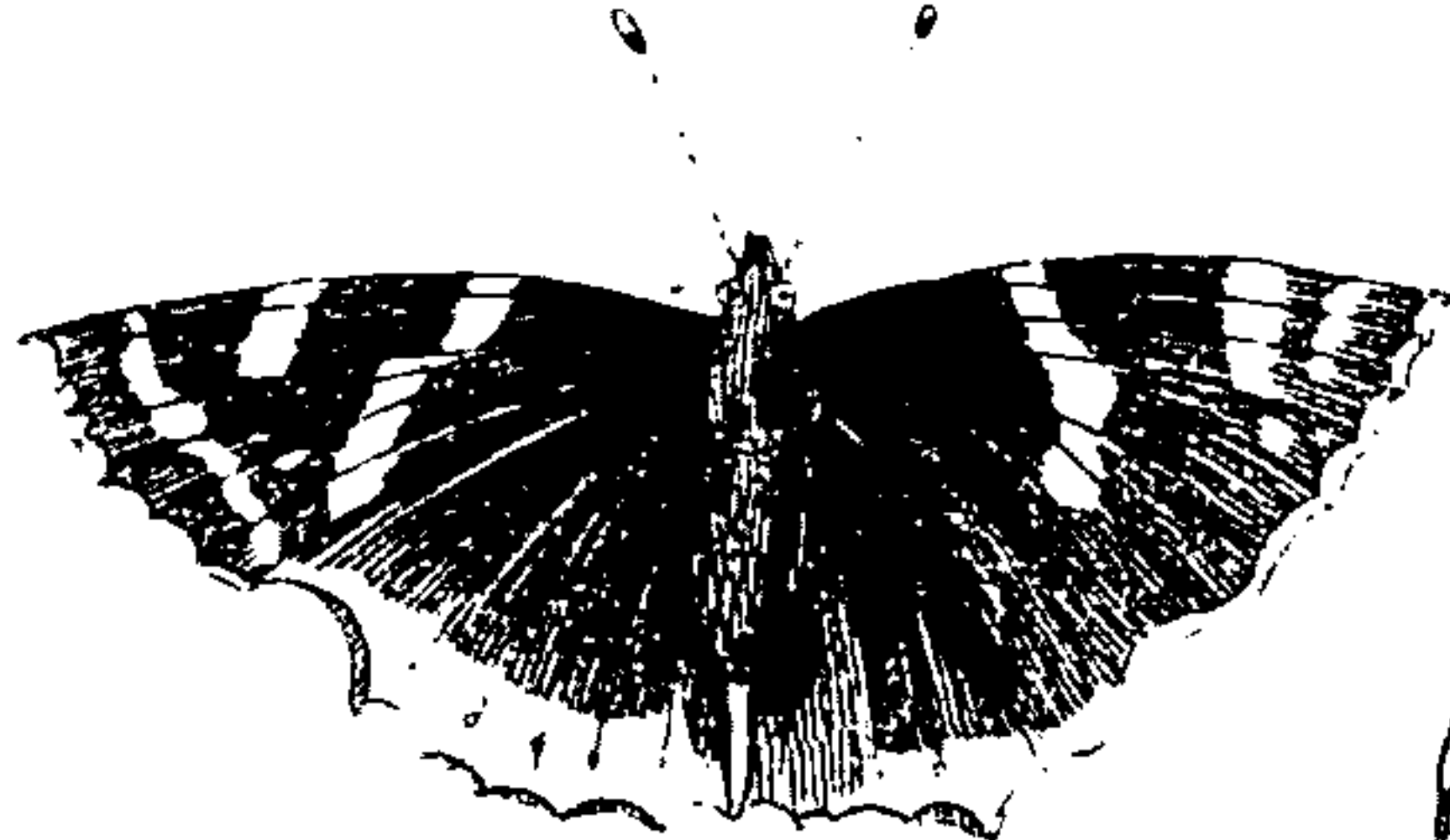
SCORPION



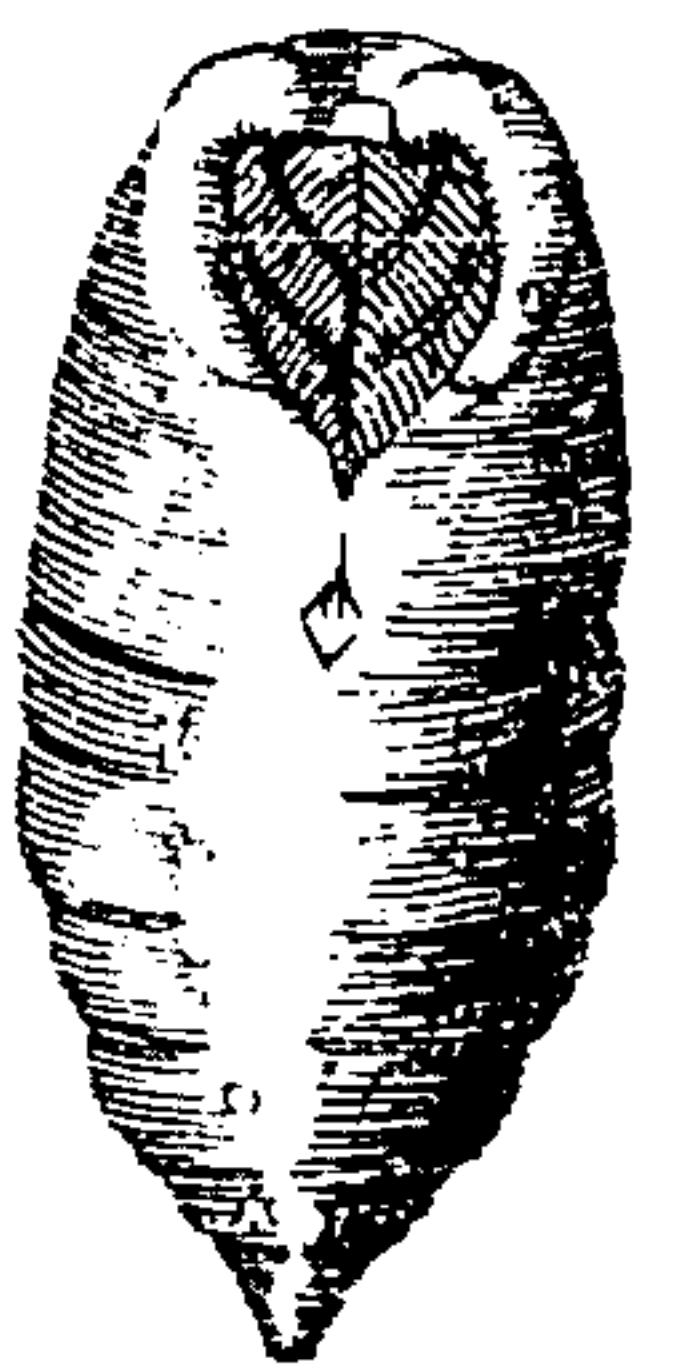
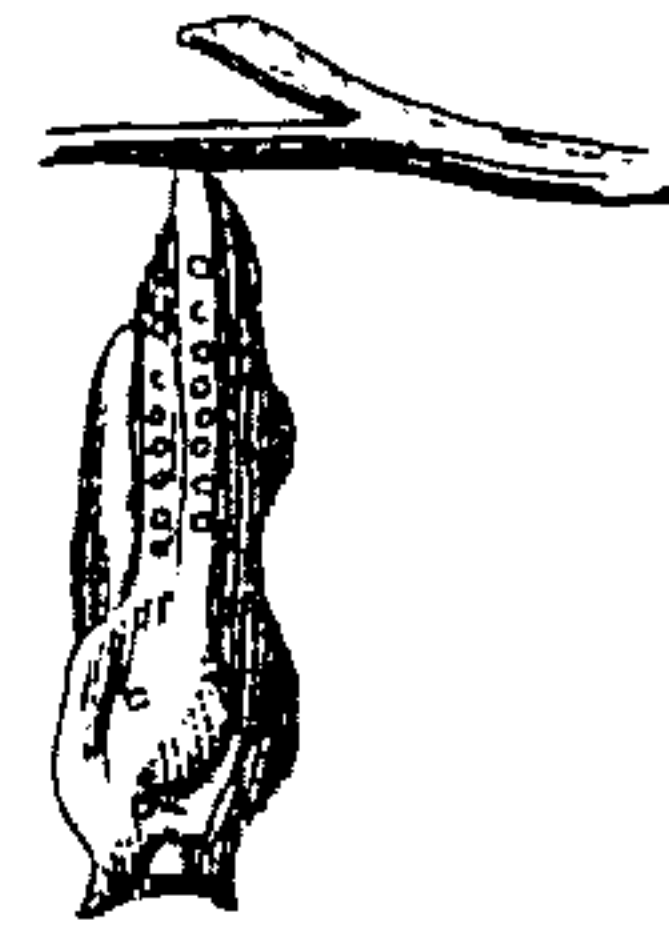
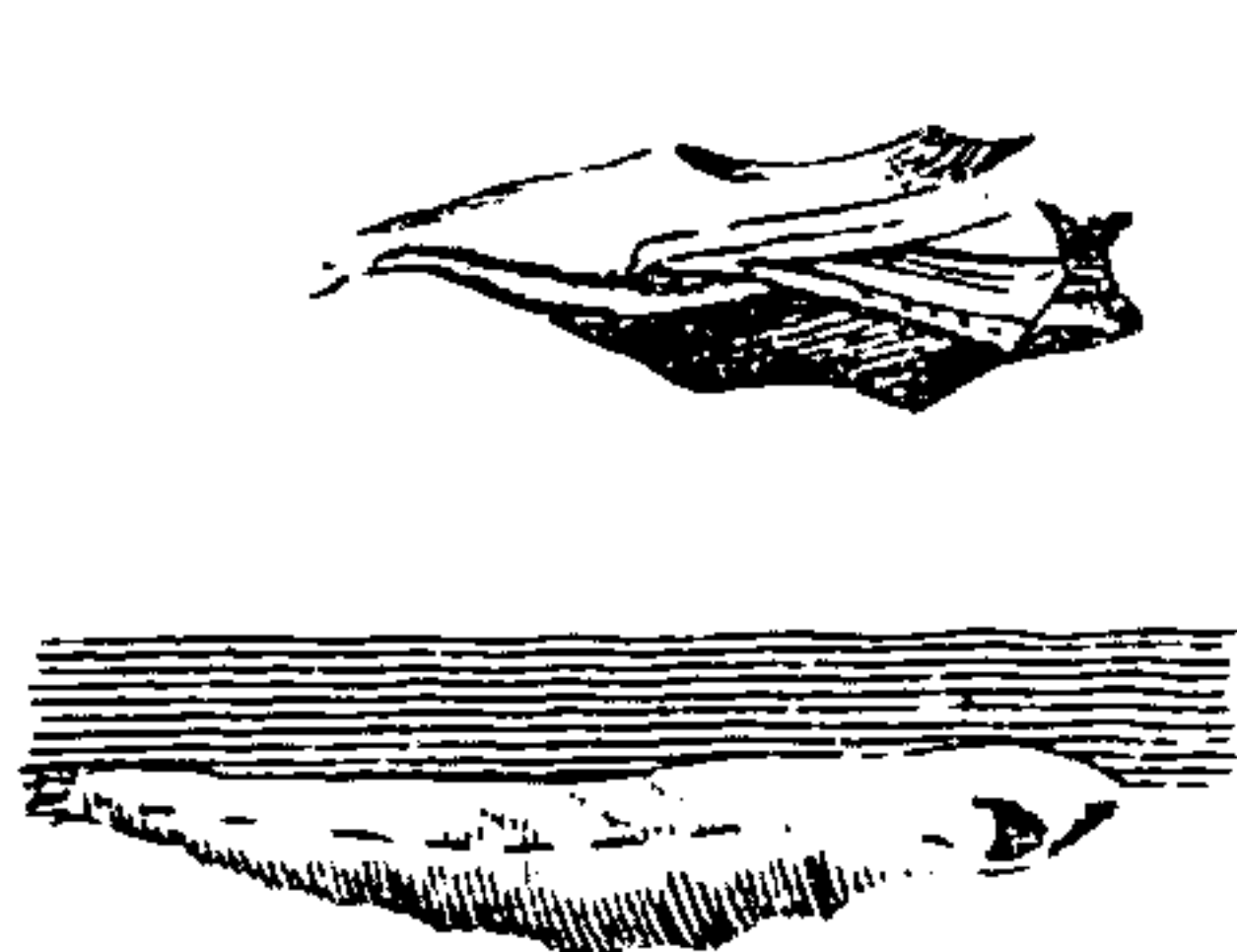
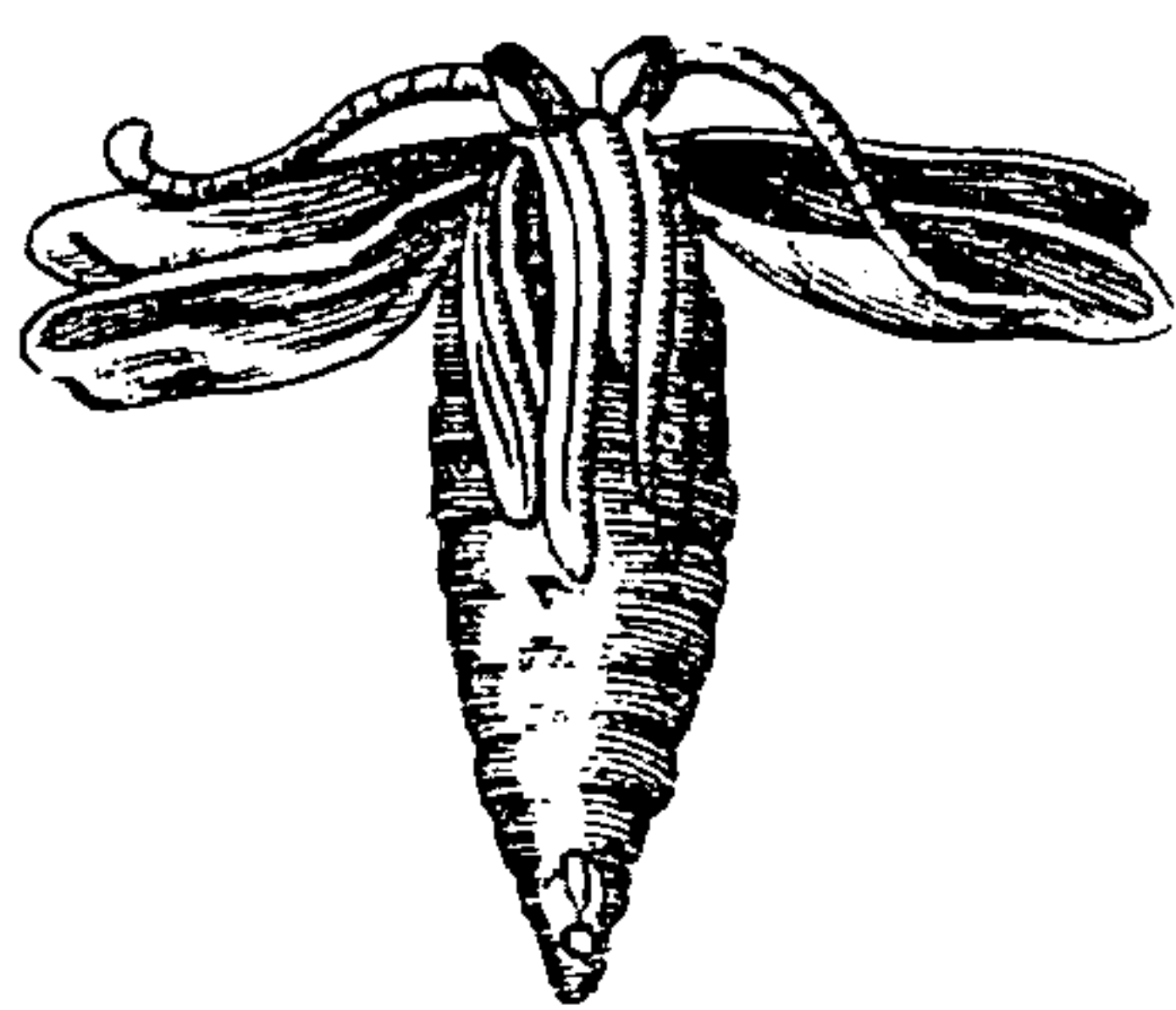
CATERPILLAR



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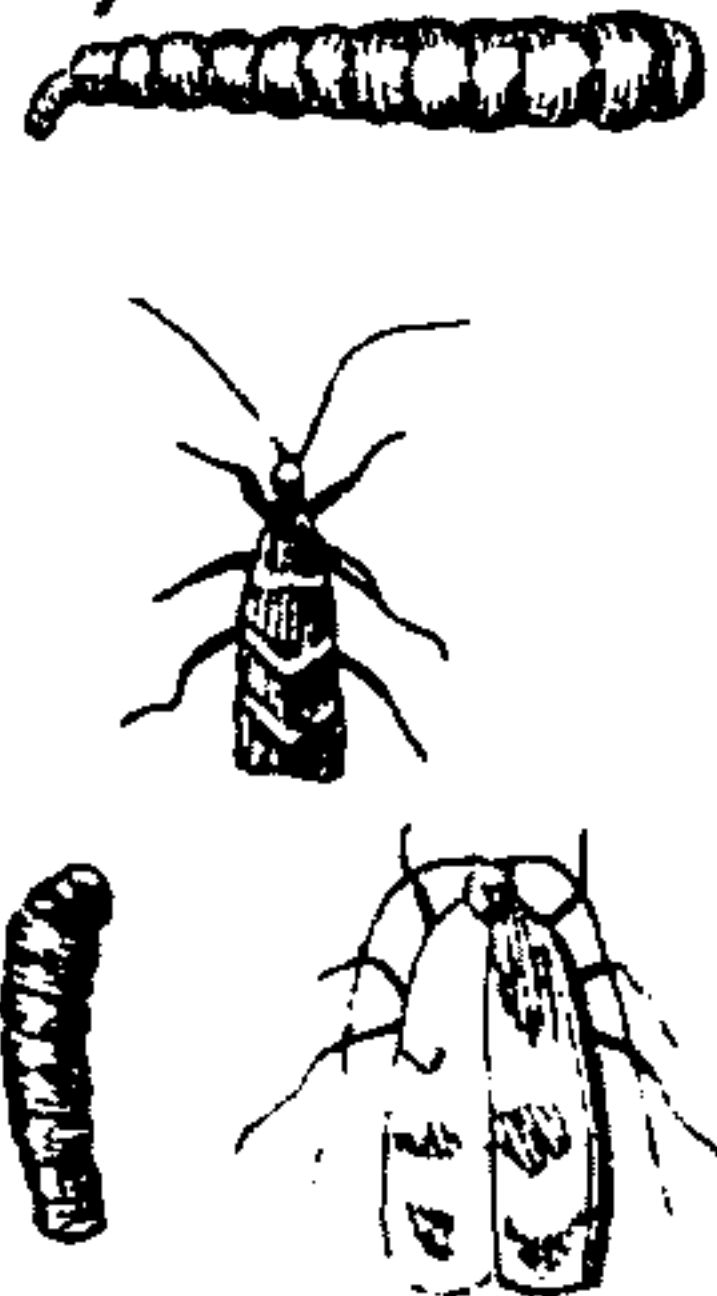


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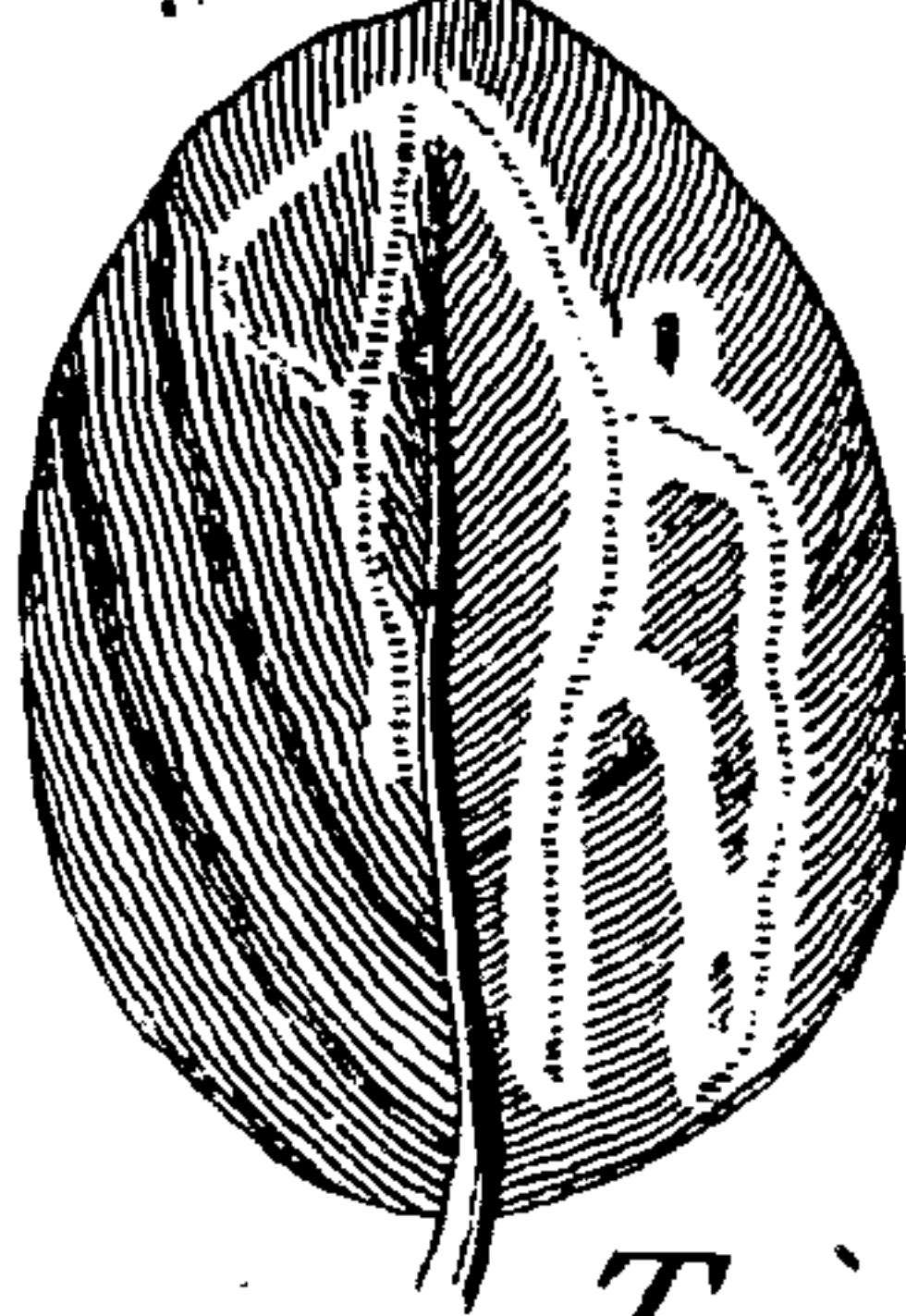


Leaf Insects

of the Oak



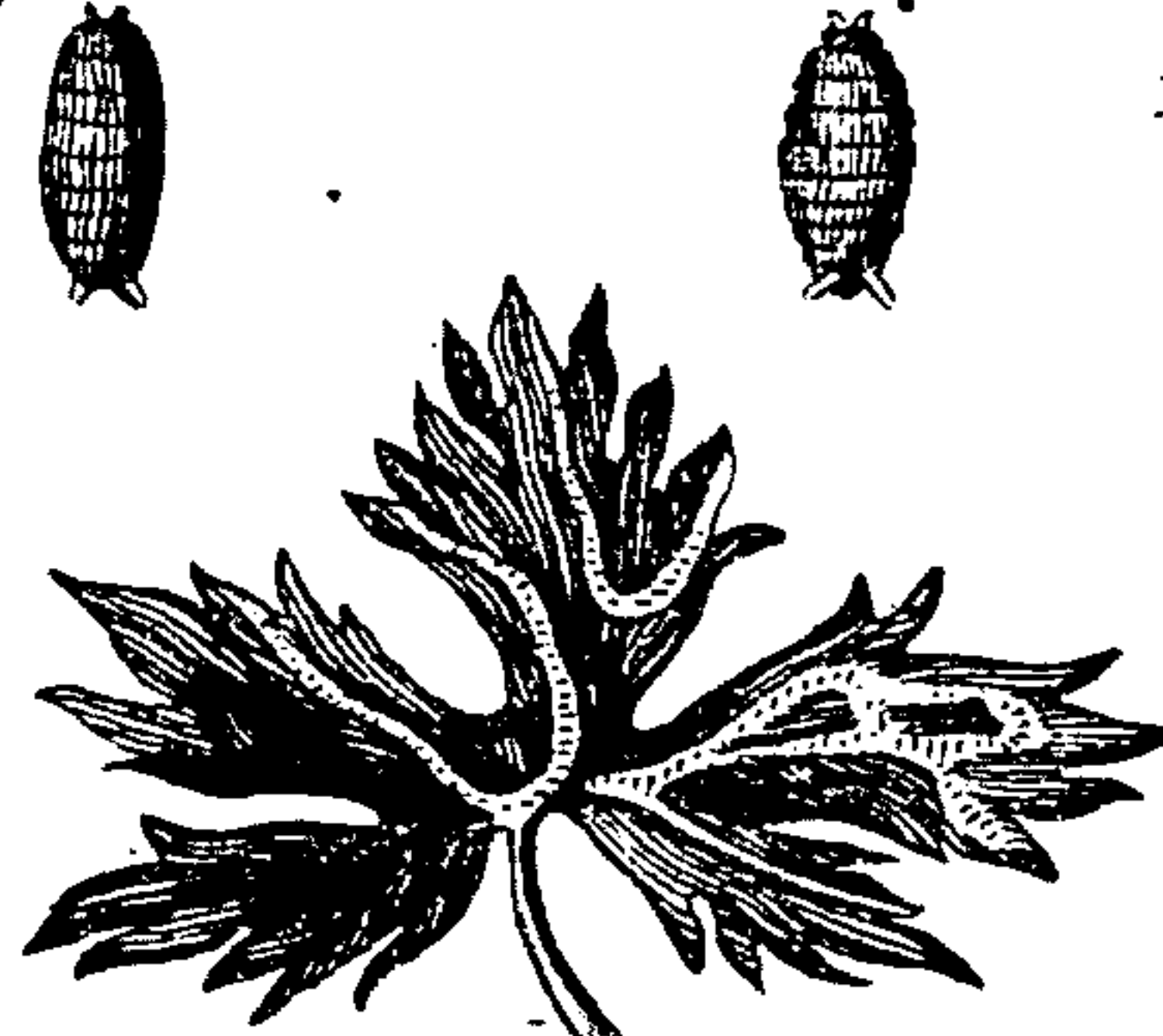
*of the
Honeysuckle.*



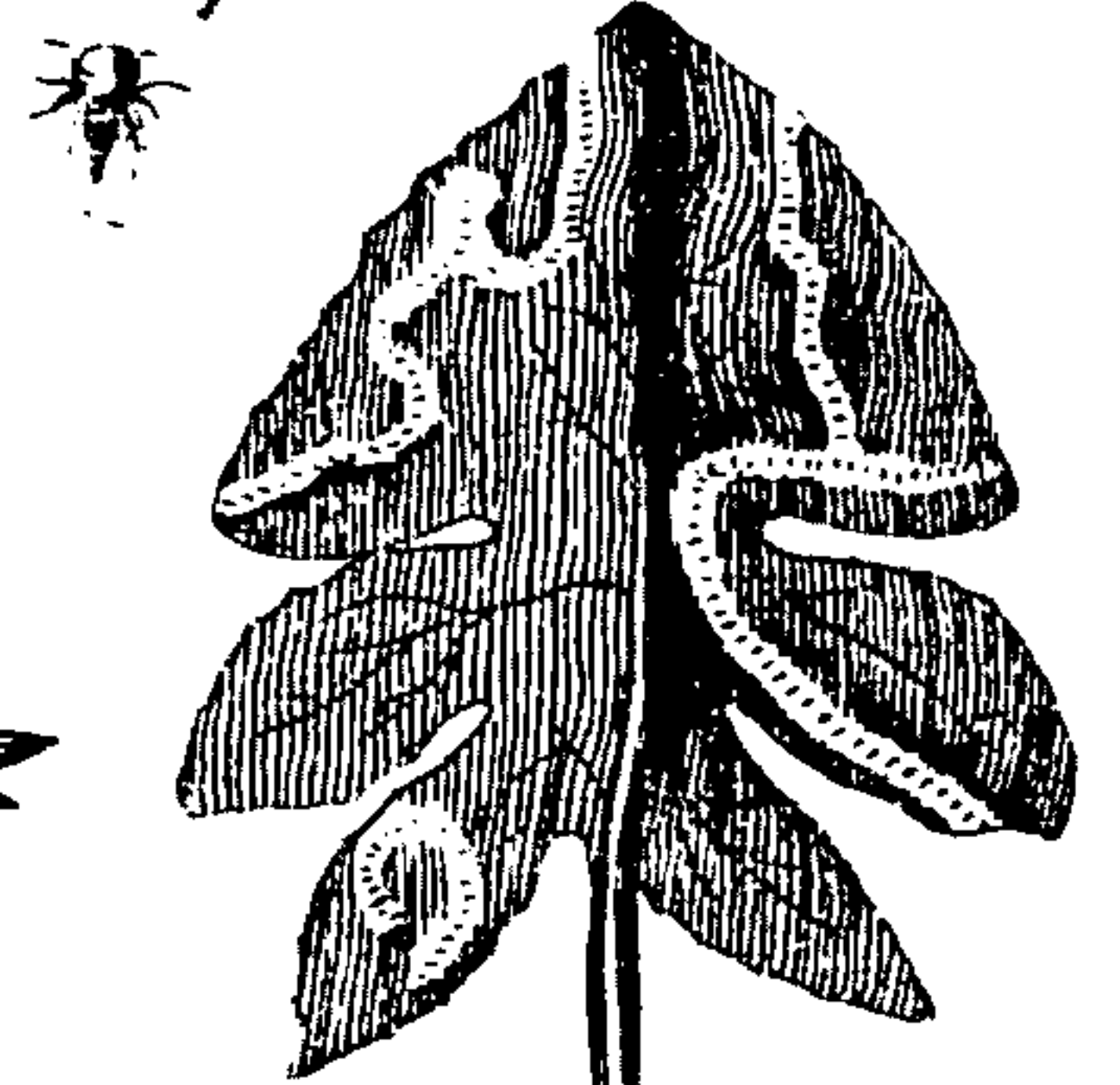
of the Trefoil



of the Ranunculus.



of the Sow Thistle.

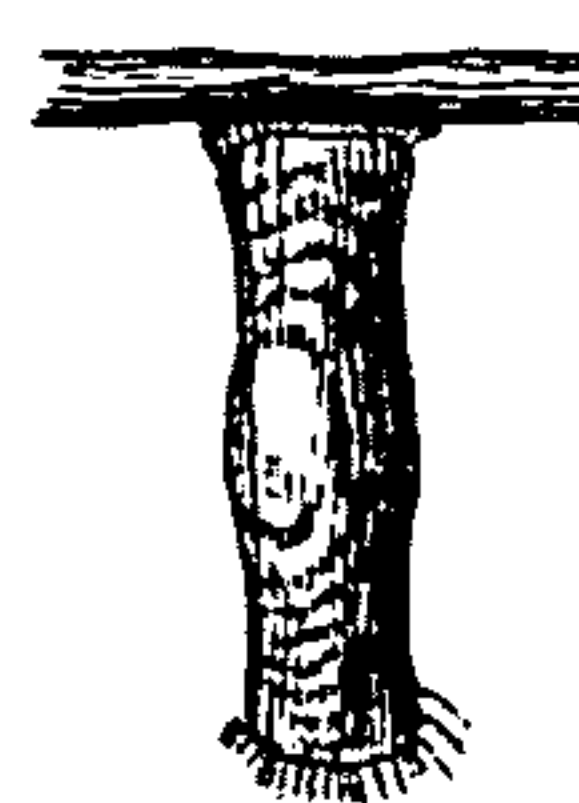
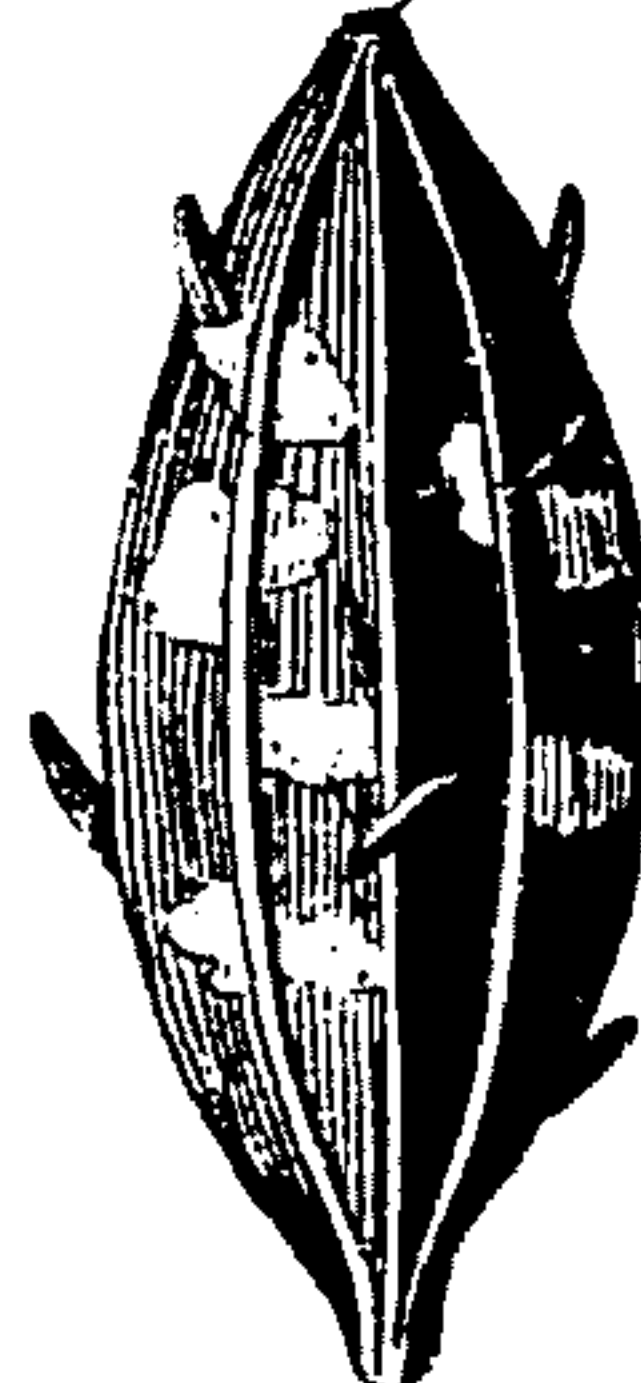


T Æ N I Æ

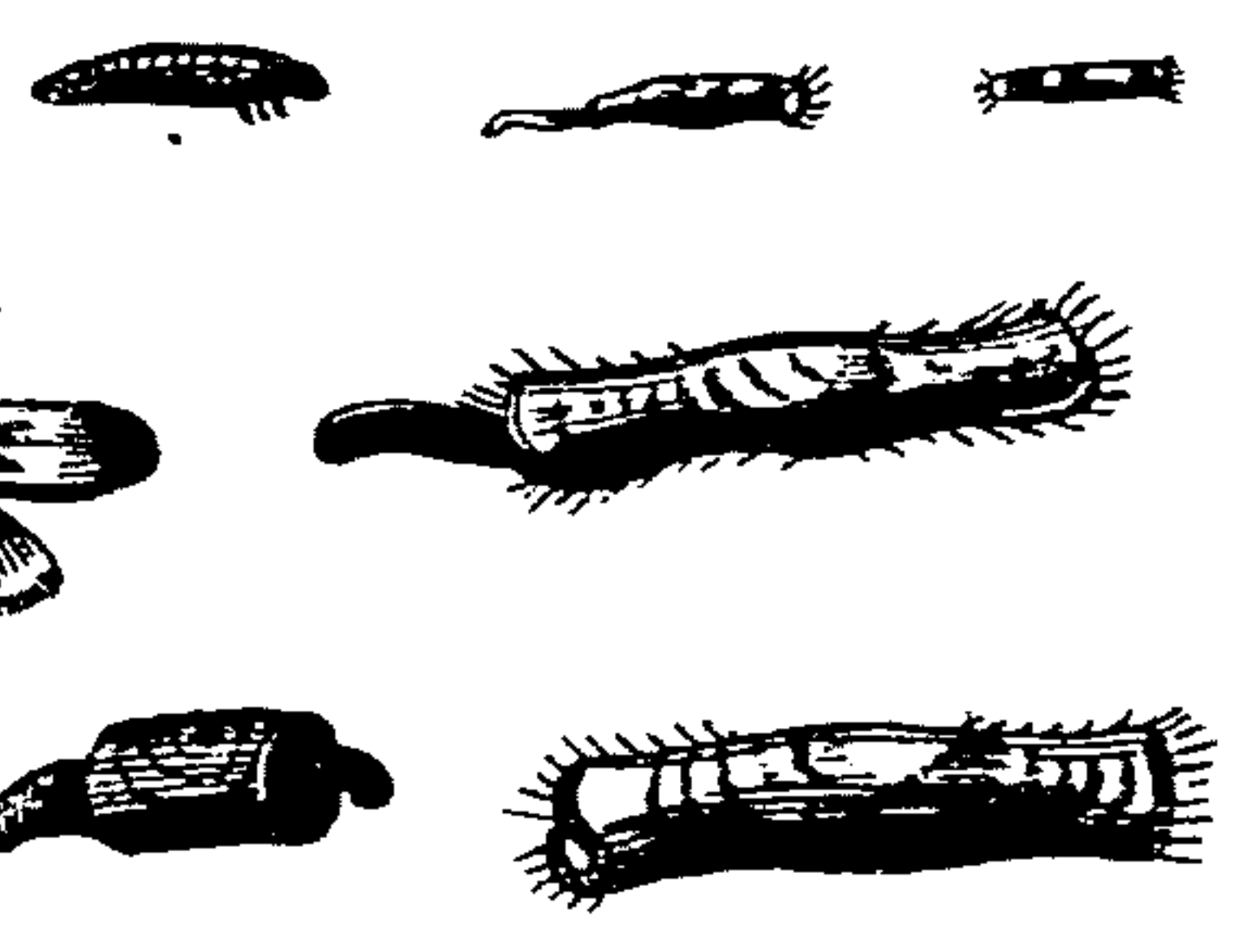
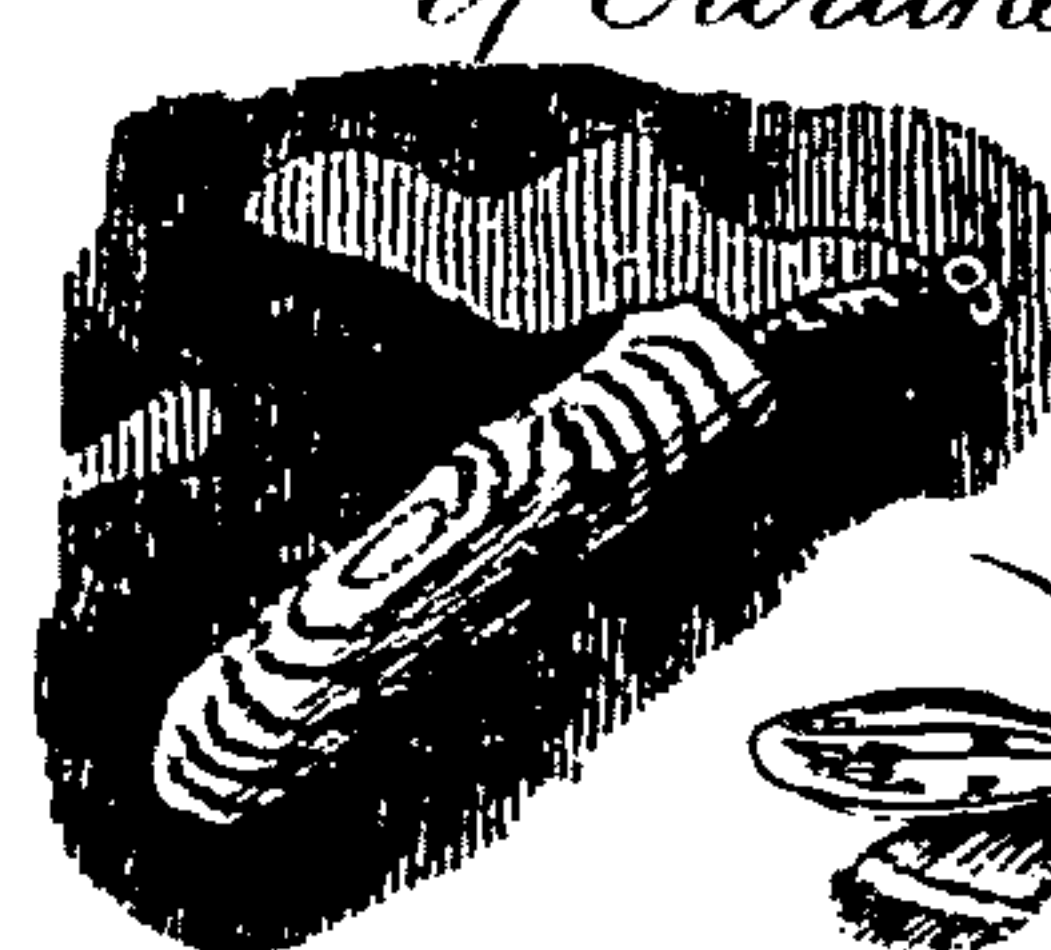
of the Elm their Cases Worms & Flies



of the Lichens



of Cloaths their Cases Worms & Flies.



the feet are dentated like a saw. Wood-Lice have great medicinal virtues, being impregnated with a saline quality, which is diuretic and stimulating.

The MONOCULUS, or WATER FLEA.

Water Fleas are of a blood colour, and are sometimes seen in such multitudes on the surface of standing water, that many people have taken it for blood. It is peculiar to the water, and has the legs before divided into branches, with which it either swims or leaps, and the body is covered with a crust or shell. It appears to have but one eye.

NATURAL HISTORY of the SCORPION.

THIS is one of the largest of the insect tribe, and is not less terrible from its size than its malignity. Its shape somewhat resembles that of a lobster, but is infinitely more hideous. Nine different kinds of this dangerous insect have been enumerated; but they are principally distinguished by their colour: some are yellow, others brown; some are of an iron grey; and others are black, red, and white. The head of the Scorpion seems to be joined to the breast; in the middle of which are seen two eyes, and two others are placed more forward in the fore part of the head: these eyes are so small as to be almost invisible. On each side of the head are two arms, each composed of four joints; the last of which is large and strong, and resembles a lobster's claw. Below the breast are eight articulated legs, each divided into six joints, the two hindmost of which are each provided with two crooked claws. The belly is divided into seven little rings; and the tail is composed of six joints, which are bristly, and appear like little globes; the last being armed with a crooked sting: this is that fatal instrument which renders this insect so truly mischievous and formidable. As it generally takes shelter in houses, it frequently stings those among whom it resides. In some of the towns of Italy, and in the province of Languedoc, in France, it is one of the greatest pests that torment mankind: but by the natives of Africa and the East, their malignity is woefully experienced. In Batavia, where they grow twelve inches long, a piece of furniture cannot be moved in the house without the utmost danger of being stung by them. We are assured by Bosman, that, along the Gold Coast, they are frequently seen larger than a lobster; and that their sting is inevitably fatal. In Europe, however, they are neither so plenty, so large, nor so venomous. There it seldom exceeds two or three inches in length, and its sting is not often fatal.

NATURAL HISTORY of the SCOLOPENDRA and GALLY WORM.

WE know little except the figure and the noxious qualities of these insects. We have some in this country that resemble them in form, but we are placed at a happy distance from such as are really formidable. With us they seldom exceed the length of an inch, but in the tropical climates they are sometimes found nine inches long. The Scolopendra, from the number of its feet, is also called the centipede. Those of the East Indies are about six inches long, of a ruddy colour, and as thick as a man's finger: they consist of many joints, and have a leg on each side of every joint: they are covered with hair, and seem to have no eyes: the head is round, and furnished with two small teeth, with which they inflict wounds that are painful and dangerous.

The Gally Worm differs from the Scolopendra in having double the number of feet: some of them are smooth and others hairy; some are black, others yellow, and others brown. When touched, they all roll themselves up in a ball. In Europe they are perfectly harmless. All these, as well as the scorpion, are produced perfect from the parent or the egg, and suffer no changes after exclusion.

NATURAL HISTORY of the LEACH.

THE common Leach is a water insect: it has the general figure of a worm, and is about as long as a man's middle finger. Its skin is composed of rings, by means of which it swims with some agility in the water. When out of the water it contracts itself in such a manner, that, when touched, it is not above an inch long. It has a small head, and a black skin, edged with a yellow line on each side: the belly is of a reddish colour, marked with whitish yellow spots. It is remarkable, that the mouth of this animal can assume whatever form it finds convenient. When at rest, however, the opening is usually triangular, and within it are placed three very sharp teeth. These animals are very useful in medicine, and when they are applied, they should be taken from the water, in which they are contained about an hour before, for they thus become more voracious, and fasten more readily. The most remarkable particular of this animal is, that tho' it takes a large quantity of food, it has no passage to eject it from the body when it has been digested: it is supposed to go off thro' the pores of the body.

The *horse-leach* is larger than the former, and grows to four inches in length. It has a smooth glossy skin, black on the back, spotted with grey. It is of no use, as it will not stick to the skin.

The *snail-leach* is about an inch in length, and of a very flat shape: its skin is smooth and glossy, and of a whitish colour. This leach will stick, tho' it is not large enough to extract a sufficient quantity of blood from the patient.

The *broad-tailed* Leach grows to an inch and an half in length, and has a smooth glossy skin, of a dusky brown colour. The back is raised into a kind of ridge. It will stick but on very few occasions. It is common on stones in shallow running waters.

NATURAL HISTORY of the LIBELLA, or DRAGON FLY.

THESE insects are called by different names in different parts of the kingdom: they are of all colours, blue, green, crimson, white, scarlet, or a union of the most agreeable tints. They are distinguished from all other flies, by the length of their bodies, the largeness of their eyes, and the beautiful transparency of their wings, which are four in number. Though there are three or four different kinds of Dragon Flies, they all agree in the most striking parts of their history. The largest are from two to three inches long; their tail is forked: their body divided into eleven rings; and their wings are of a beautiful glossy transparency. They have two teeth, covered with a beautiful lip; they bite fiercely when they are taken; but their bite is perfectly harmless. These animals are produced from eggs, deposited in the water; they afterwards become worms, and have six legs; they continue in their reptile state for a year; at length their wings expand, and they enter upon the flying state.

NATURAL HISTORY of the ANT-LION.

THIS insect in its reptile state, is of the size of a common wood-louse, but somewhat broader. It has a longish head, and a roundish body, which becomes a little narrower towards the tail. The colour is a dirty grey, speckled with black. The body is composed of several flat rings, which slip one upon another. It has six feet, four fixed to the breast, and two to the neck. It is generally produced in autumn, and in about a year afterwards it assumes a winged form, and becomes a large and beautiful fly of the libellular kind, with a long slender body of a brown colour; with large bright eyes, long slender legs, and four large transparent wings.

NATURAL HISTORY of the GRASS-HOPPER, and the LOCUST.

THERE are a tribe of little animals, which, though differing in size and colour, strongly resemble each other in figure, appetite, and nature. Of this variegated tribe, the common Grass-Hopper, that is found in such plenty in every meadow, and that continues chirping through the summer, is best known to us; and a history of that will contain a history of all the rest. The colour of this animal is green, with a line of brown which streaks the back, and two pale lines under the belly and behind the legs. The head is oblong, in some degree resembling that of a horse. The mouth is armed with teeth of a brown colour, hooked at the point. The corset is elevated, narrow, armed above and below by two serrated spines. The back is armed with a strong buckler. The last pair of legs are longer and stronger than the first two pair, fortified by thick muscles, and admirably formed for leaping. It has four wings; the belly is composed of four rings, and terminated by a forked tail.

The Grass-Hopper, though seemingly without wings, is in reality possessed of them from the first, but it cannot break the bonds by which they are folded up, till it has been excluded above twenty days. When arrived at their winged state they are still vocal, and in the midst of summer, are heard much louder at sun-setting than during the heat of the day. Though slow in flight, they are sometimes seen to fly to considerable distances.

The larger kinds differ from this only in size, rapidity of flight, and the powers of injuring mankind, by swarming upon the productions of the earth. The grass which is destroyed by a few Grass-Hoppers which sport in our fields can be of no great consequence; but when a swarm of Locusts, two or three miles in length, and several yards in depth, settle upon a field, the consequences are frightful.

Europe is seldom visited by them in this manner. Those which were seen in several parts of England in the year 1748, were the great brown Locusts, and dreadful consequences were apprehended from their appearance. They were about three inches long.

Locusts are eaten by the natives in many kingdoms of the East. They certainly were a common food with the Jews, as Moses, in the book of Leviticus, permits them to eat four different kinds of this animal, which he particularly specifies.

The great West Indian Locust is the most noxious of this tribe of animals. It is armed with a sting, and those who touch it are sure to be stung by it: a little palm-oil, however, is a certain cure for it.

NATURAL HISTORY of the CRICKET.

THIS insect resembles the grass-hopper in its shape, its voice, and its leaping; but its colour is uniformly of a rusty brown. Its residence is most usually in the warmest chinks behind a country hearth. It is, of a most chilly nature, seldom quitting the fire side. It is a voracious little animal, and will eat sugar, bread, meat, or flour. Except in the very coldest weather, they never cease their chirping.

There is a species of this insect that lives entirely in the woods and fields.

The Mole-Cricket is a very large insect, being two inches and an half in length, and three quarters of an inch in breadth. It chiefly resides under the surface in soft garden grounds, and is very injurious to gardeners.

NATURAL HISTORY of the EARWIG and the FROTH INSECT.

THE Earwig is so common as hardly to require a description: it is equally remarkable for its swiftness in the reptile state, and its velocity when it has arrived to its winged state. It is very prolific, and very harmless. The name, and the deformity of its figure, have subjected it to an imputation which has often procured its destruction. It is said that it often enters into the ears of people sleeping; thus causing madness from the intolerable pain, and soon after death itself; these reproaches, however, are entirely groundless: it were to be wished, that the accusations which gardeners bring against the Earwig were as slightly founded. At length the wings of this animal burst from their confinement, and when it becomes a winged insect it flies in pursuit of the female, ceasing to feed, and is wholly employed in the business of propagation. After having lived a few days in its winged state, and taken care for the continuance of posterity, it dries up and expires.

To this order of insects belong the Cuckow-Spit or Froth-Worm, that is often found in the frothy matter on the surface of plants. The Water Tipula, the common Water Fly may be classed in the same order. To these may be added the Water Scorpion, which is near an inch in length, and half an inch in breadth. The Water Scorpion lives in the water by day, out of which they rise into the air in the dusk of the evening, and often betake themselves to other waters in quest of food.

NATURAL HISTORY of the EPHEMERA.

THERE are several kinds of Ephemeræ, which are of various colours, as brown, yellow, and cream-coloured. It appears surprising that there should be a tribe of flies whose duration extends but to a day; but some of this kind seem to be born and to die in a much shorter time: the reptile, however, from which they are bred, are sometimes known to live two or three years. They are produced from the egg in the form of worms, from whence they change into the form of aurelias; and from thence they take their last mutation, which is into a beautiful fly, of a shorter or longer duration, according to its kind. In its fly state, it is a beautiful winged insect, and strongly resembles the butterfly. But though the usual date of these flies is five or six hours, there are some kinds that live several days.

NATURAL HISTORY of the CATERPILLAR, BUTTERFLY, and MOTH.

CATERPILLARS are readily distinguished from worms or maggots by the number of their feet, and by their producing Butterflies or Moths.

WINGED INSECTS.

FLIES



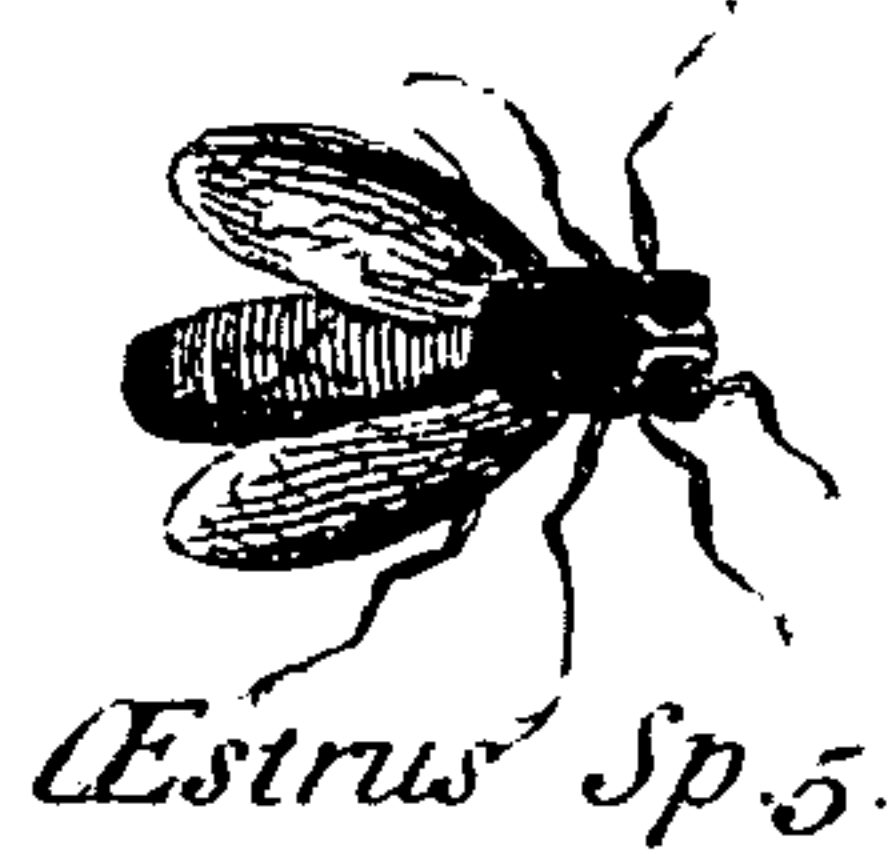
*The Breeze
or Gad Fly*



*The Gray
or Trumpet Fly*



Æstrus Sp. 7



Æstrus Sp. 5



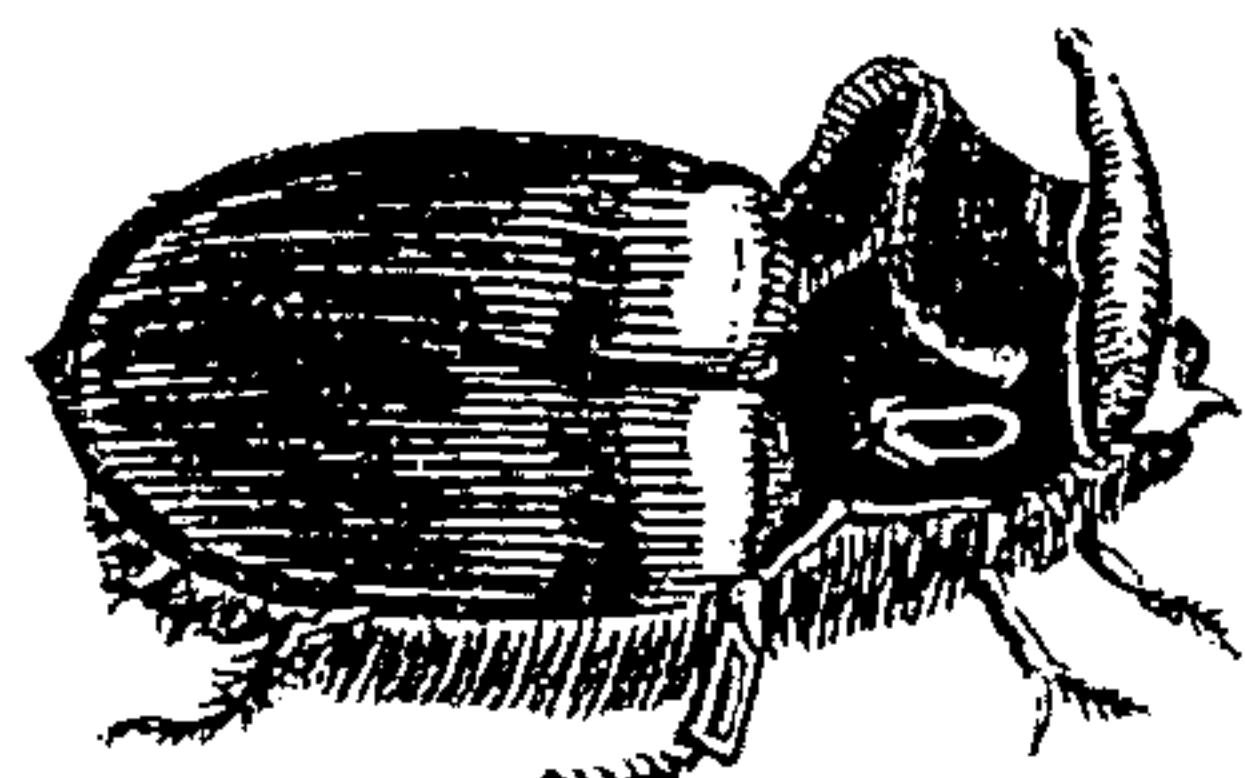
The Wasp Fly



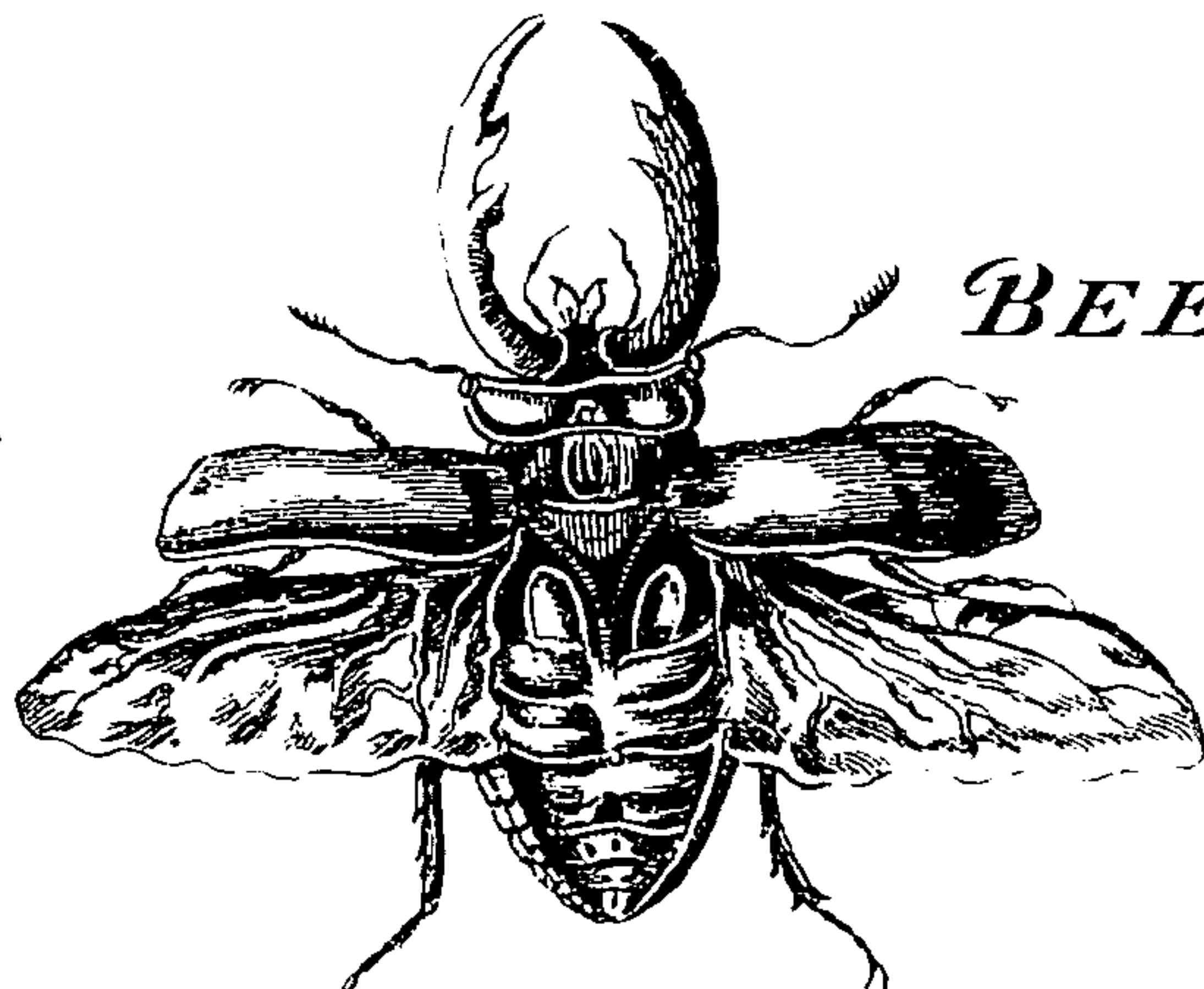
The Hornet Fly



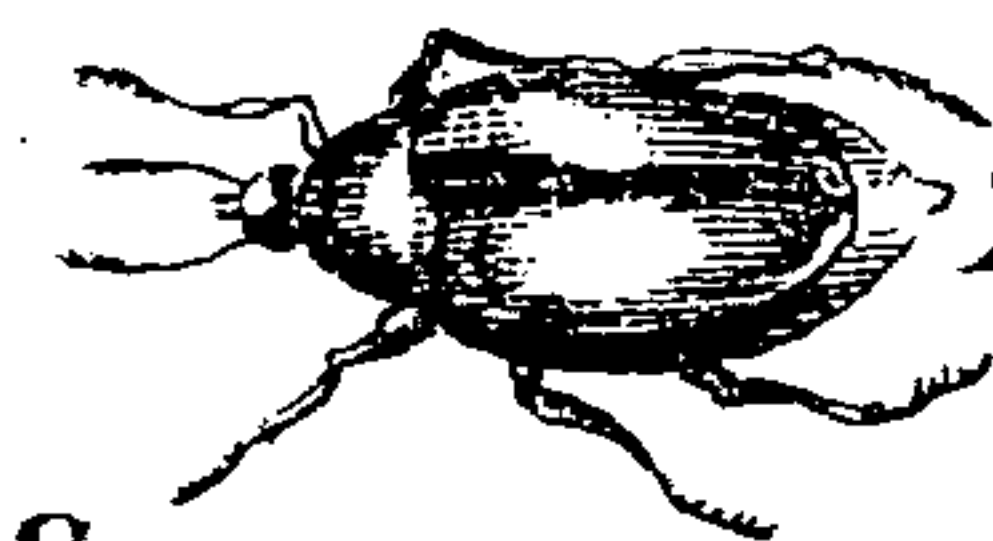
The little Oval Beetle



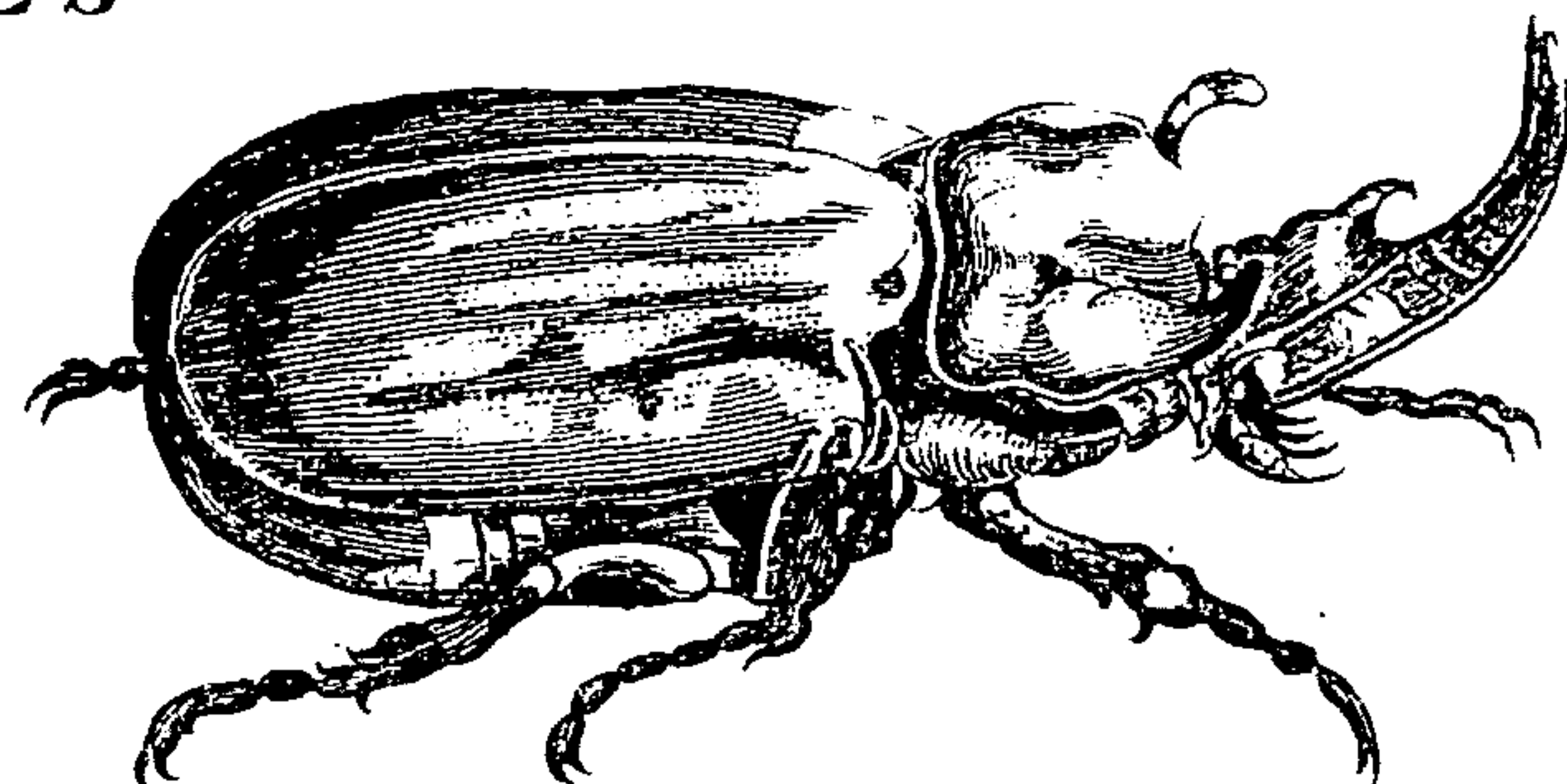
The Unicorn Beetle



The Staghorn'd Beetle



The Brass Beetle

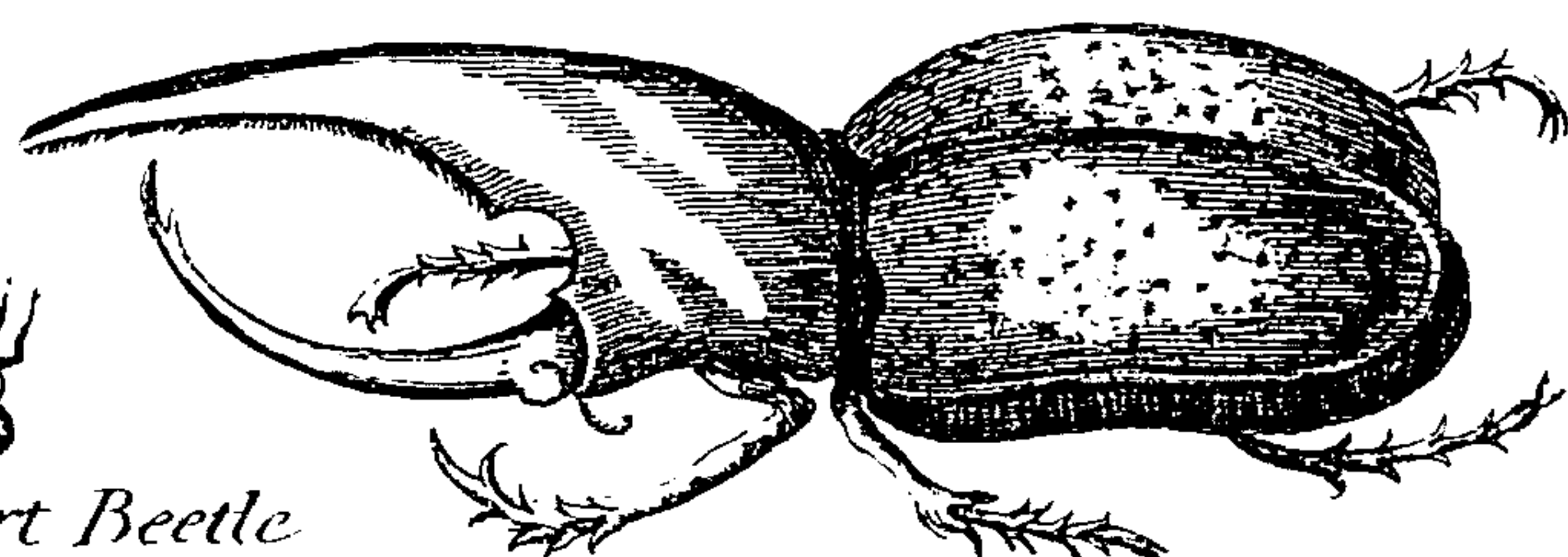


The Rhinoceros Beetle

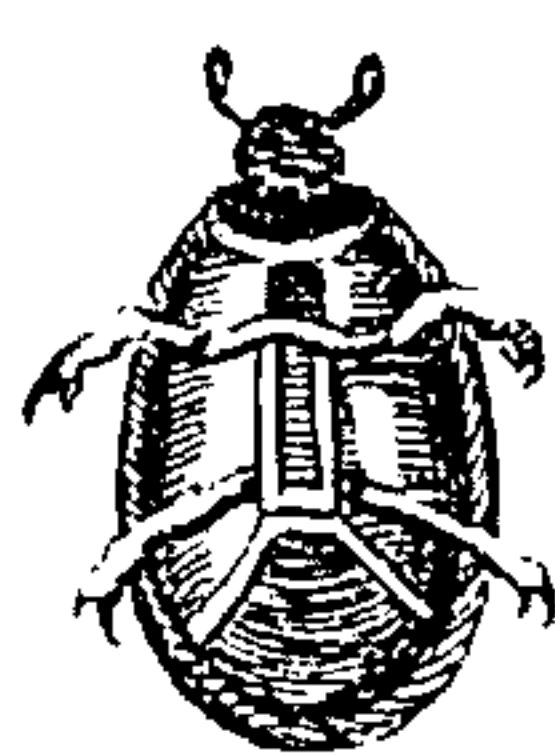
BEETLES



The Sawwort Beetle



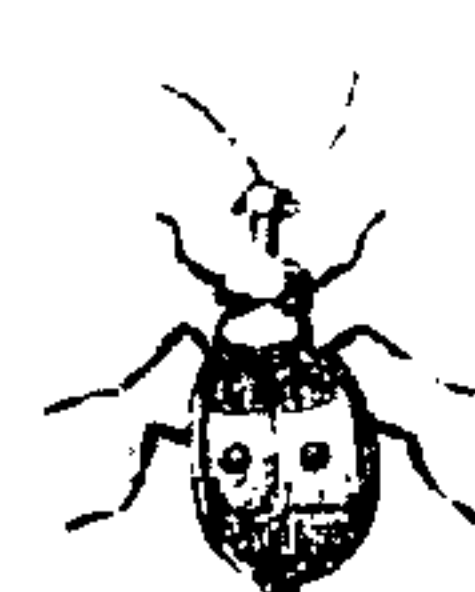
The Shining Beetle Sp. 3



*Dermestes
Sp. 1*



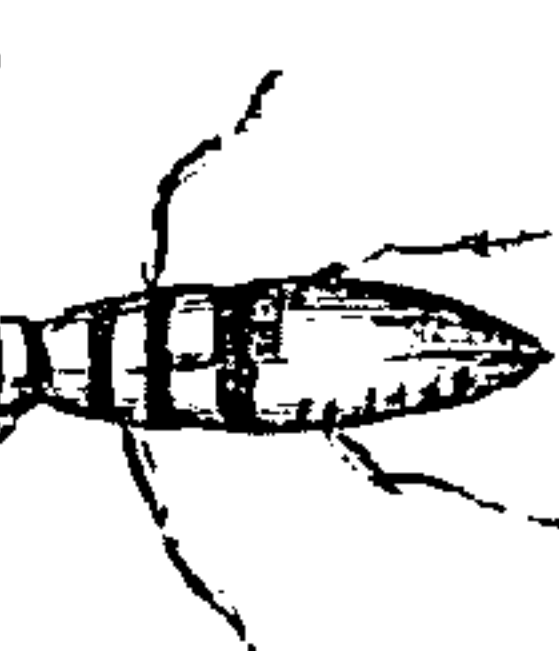
*Dermestes
Sp. 11*



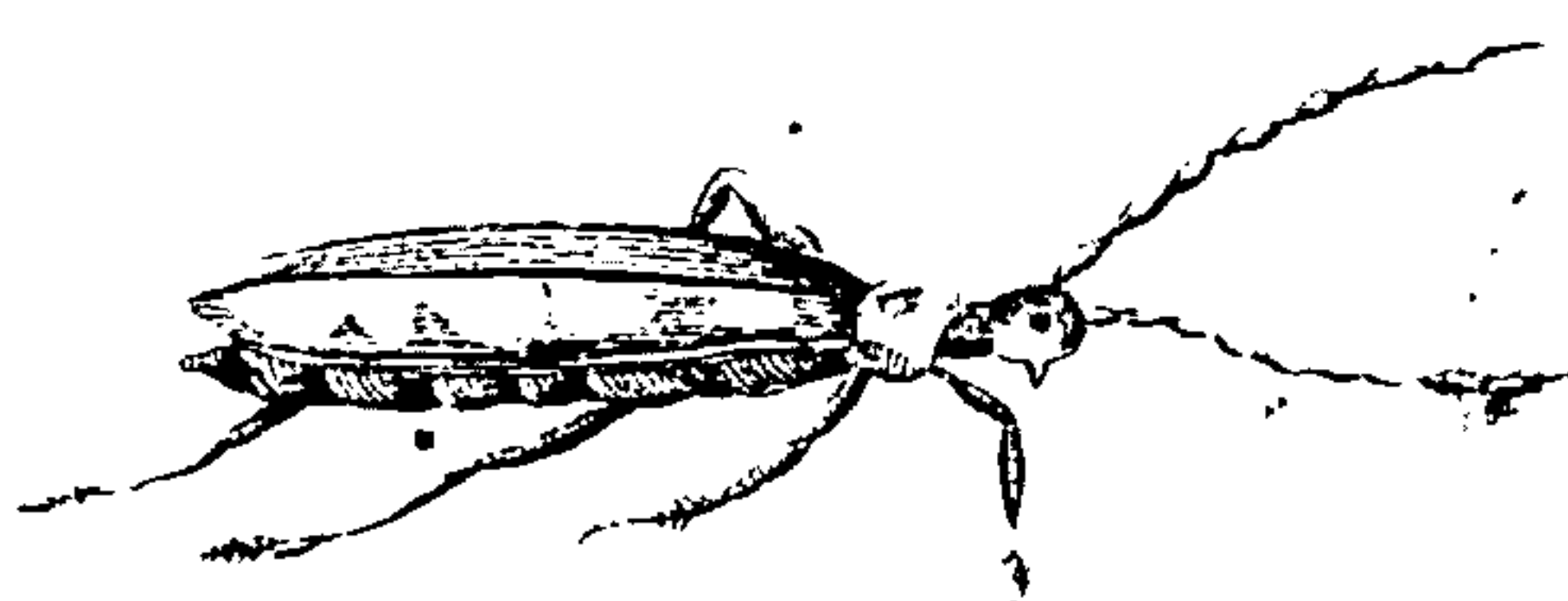
*Cassida
Sp. 3*



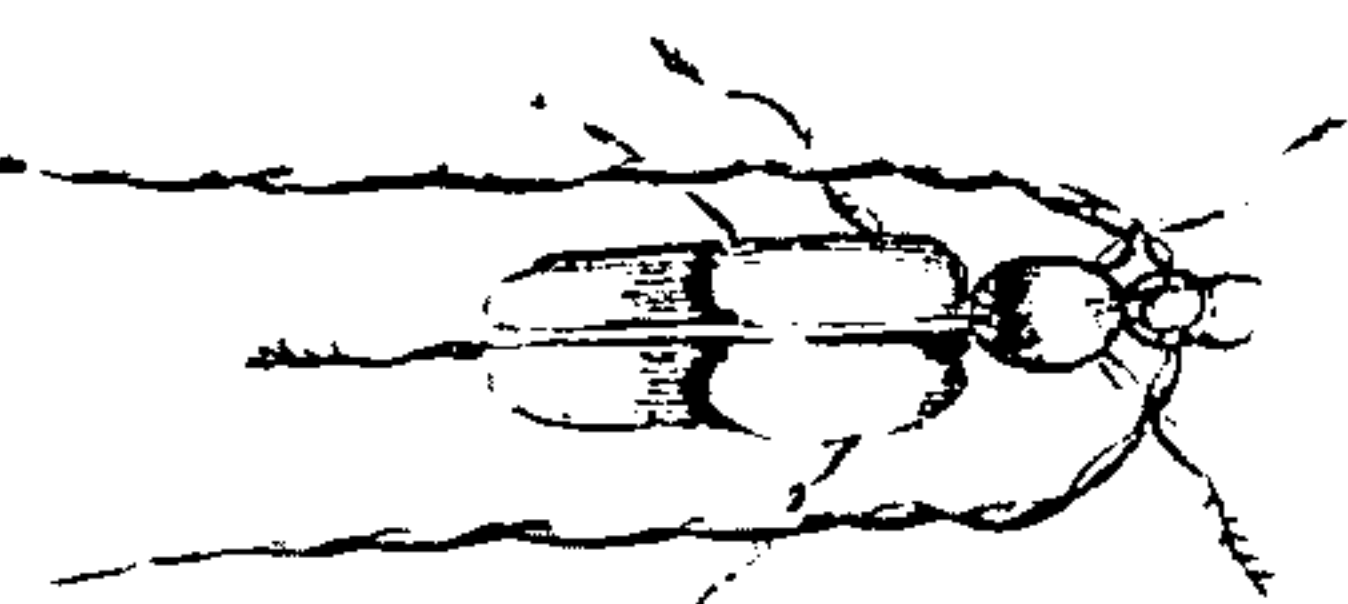
*The Green
Tortoise Beetle*



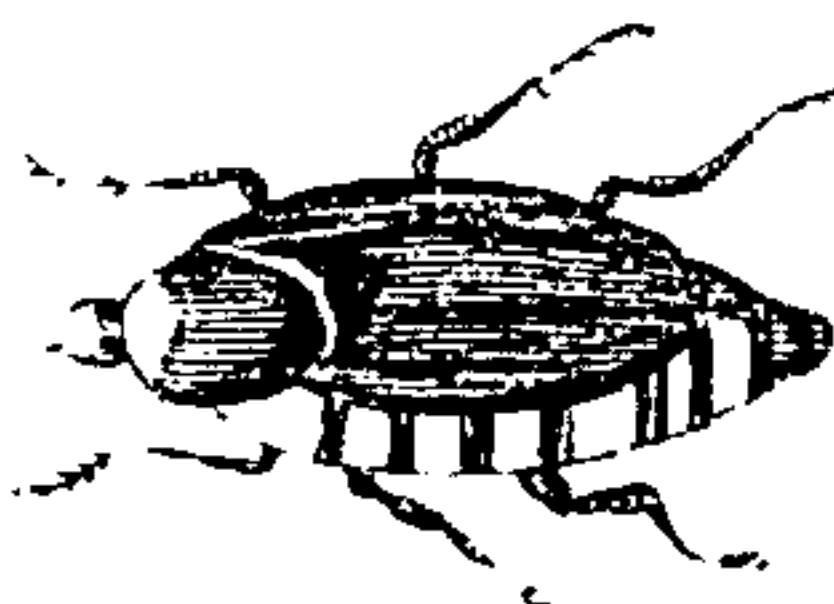
Cassida Sp. 2



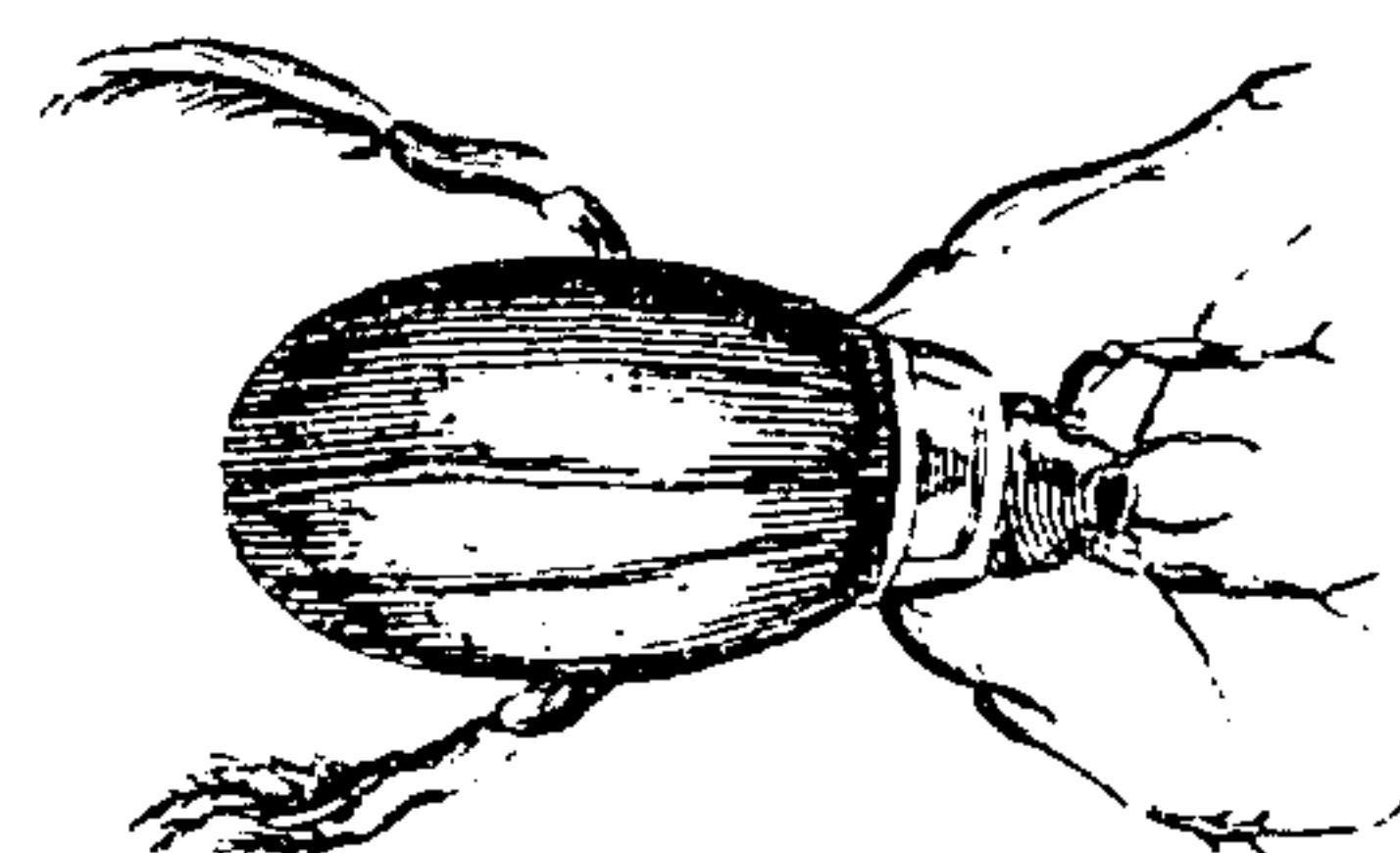
Cerambyx Sp. 7



Cerambyx Sp. 8



Dytiscus Sp. 5



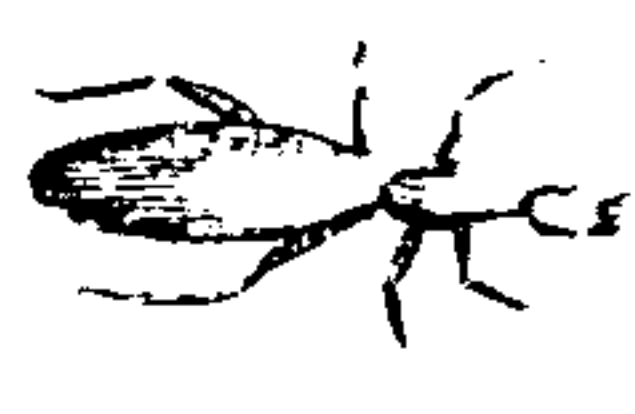
The great Water Beetle



*Mordella
Sp. 1*



*Mordella
Sp. 2*



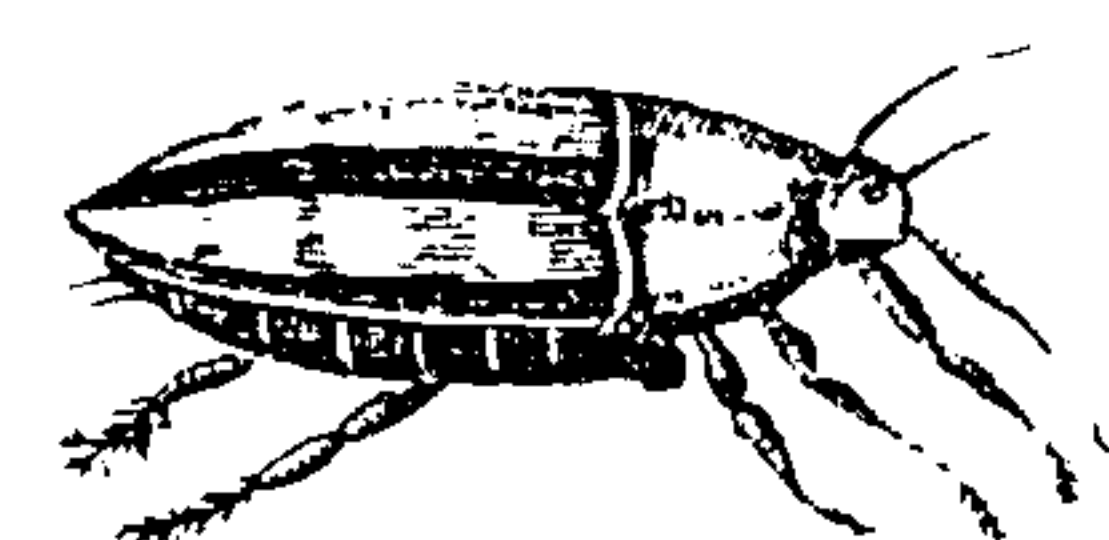
*Cicindela
Sp. 1*



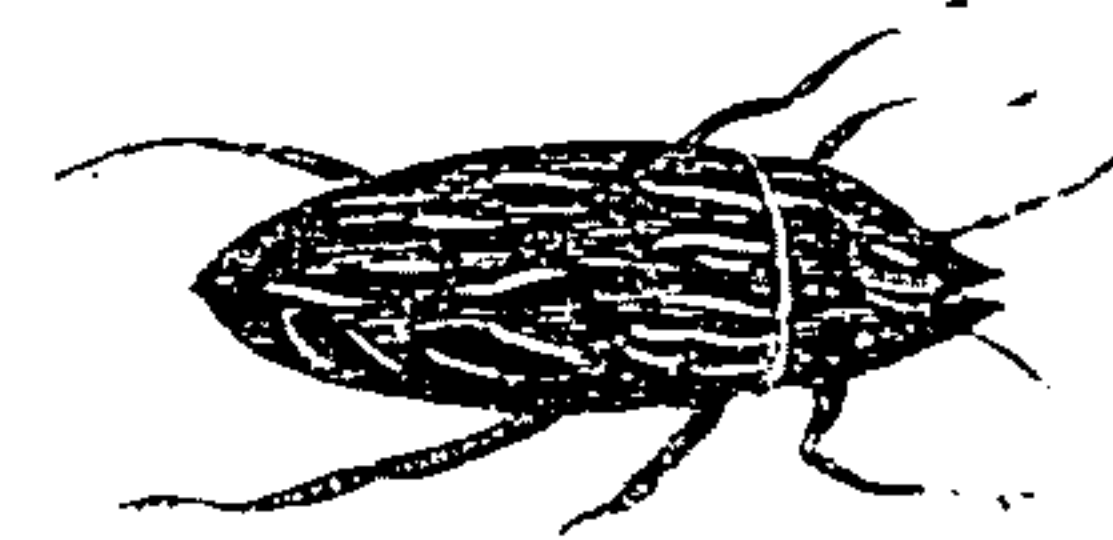
*Cicindela
Sp. 5*



Buprestis Sp. 2



Dytiscus Sp. 2



Dytiscus Sp. 6



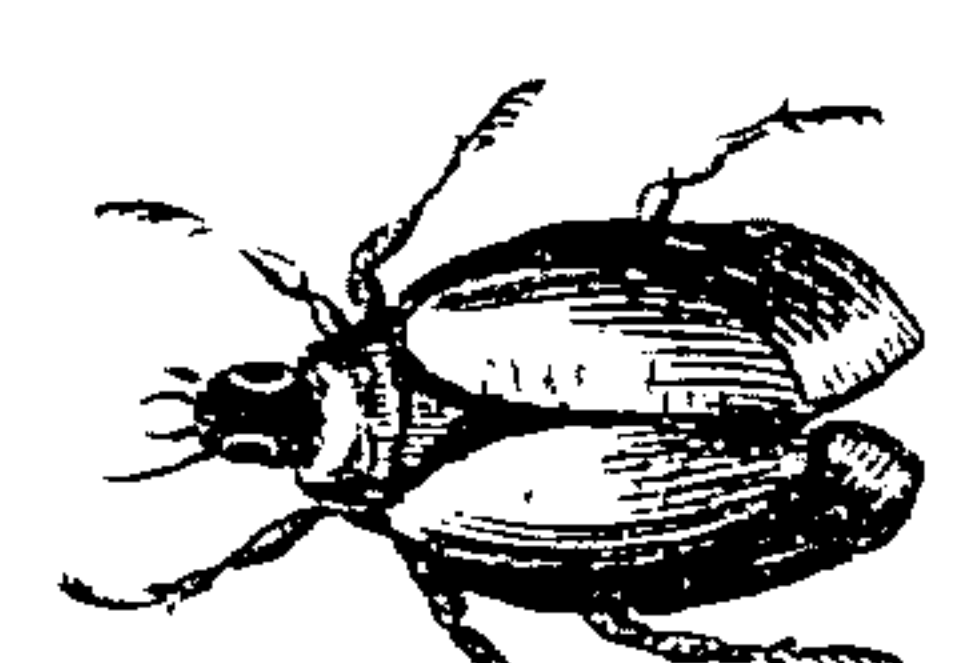
Elatér Sp. 2



*Elatér
Sp. 6*



Cantharis Sp. 4



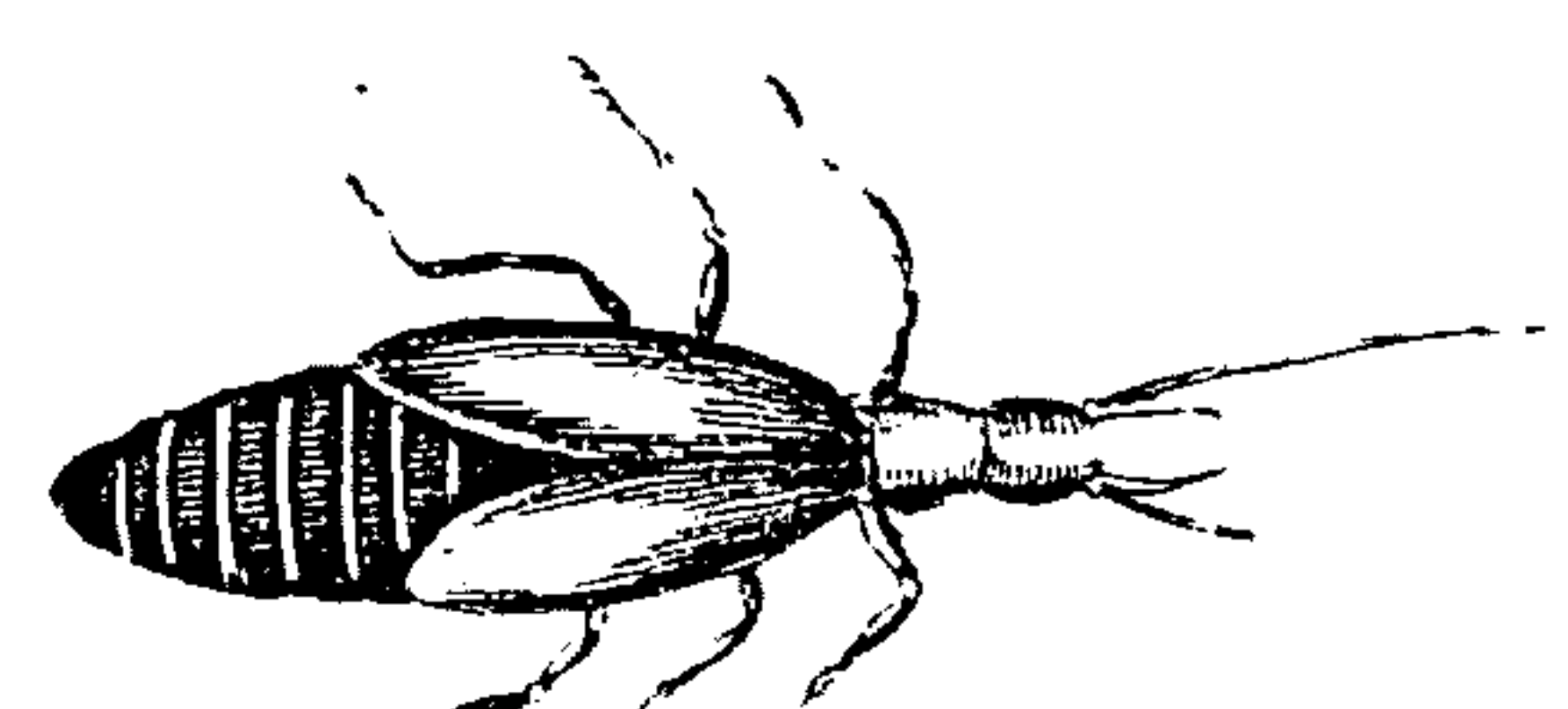
Cantharis Sp. 5



The Mill Beetle



Nectydalis Sp. 2



The Oil Beetle

LOCUSTS



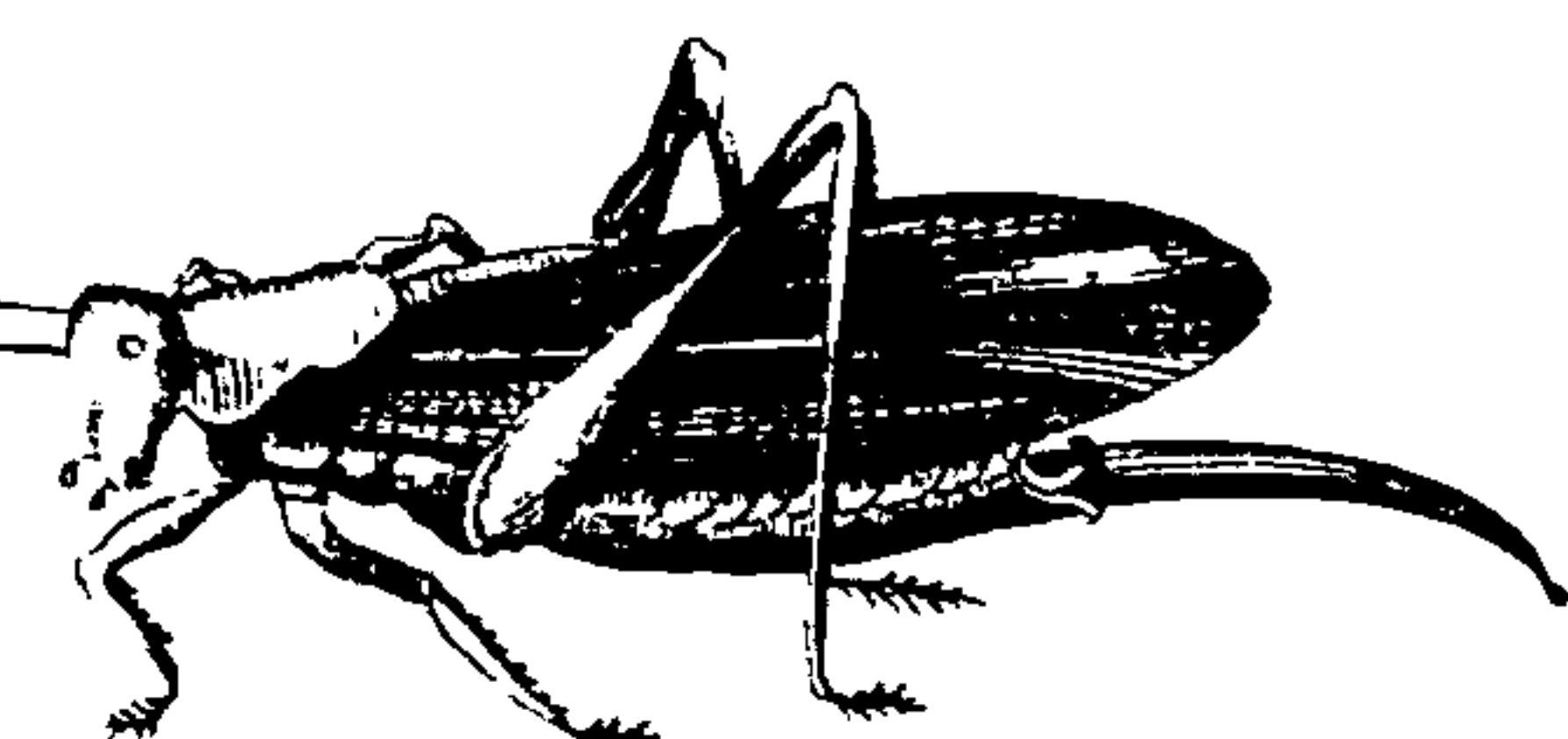
*Staphylinus
Sp. 3*



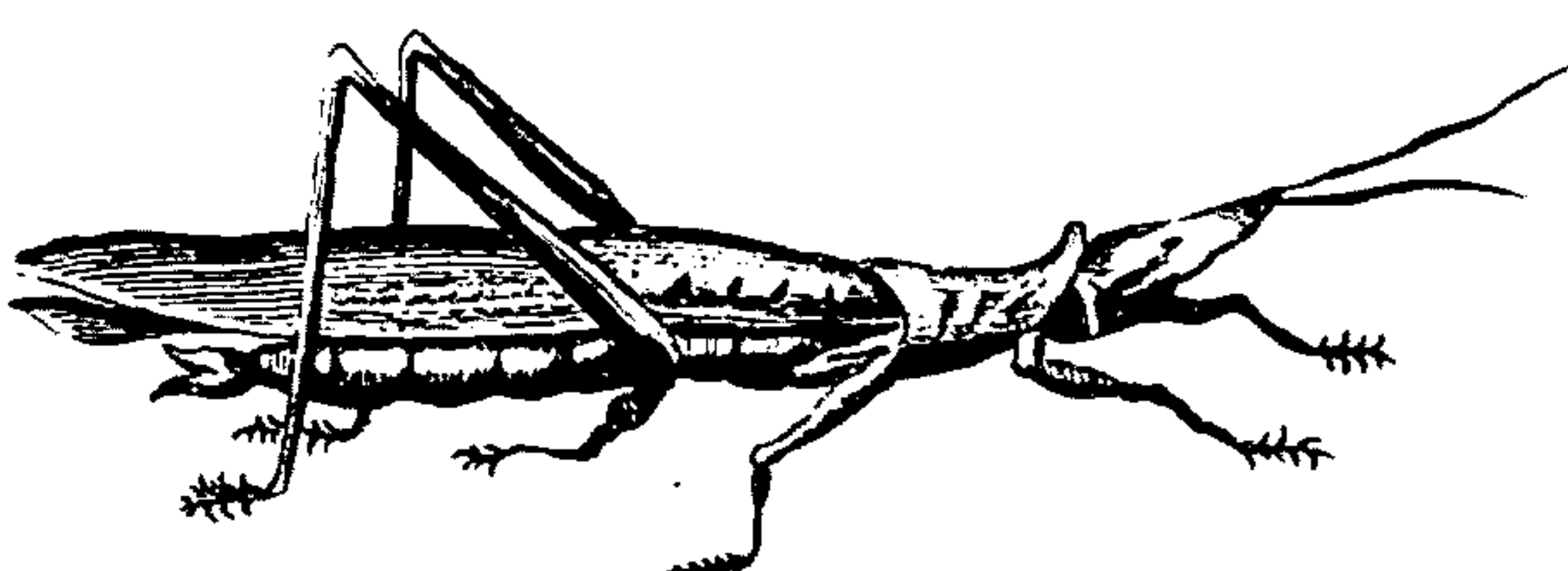
The Mole Cricket



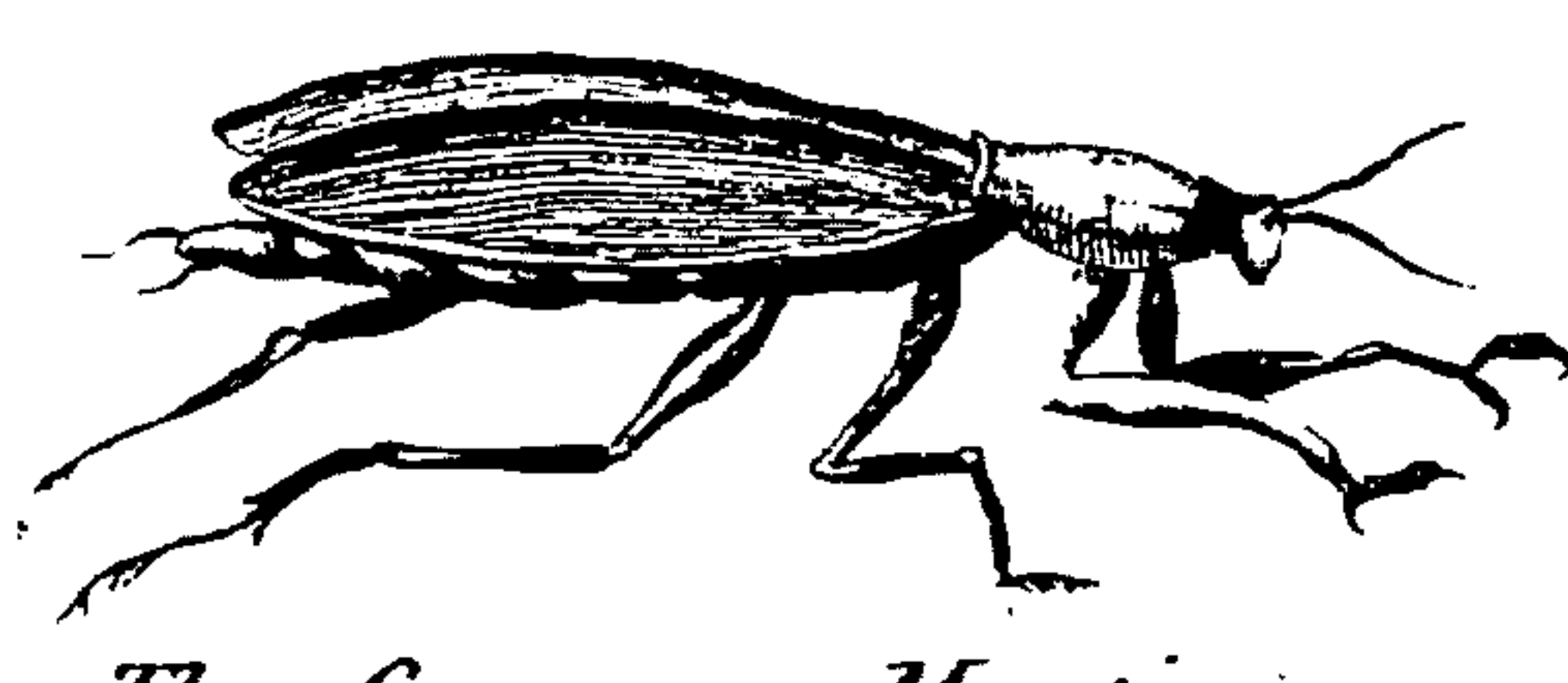
The Spanish Locust



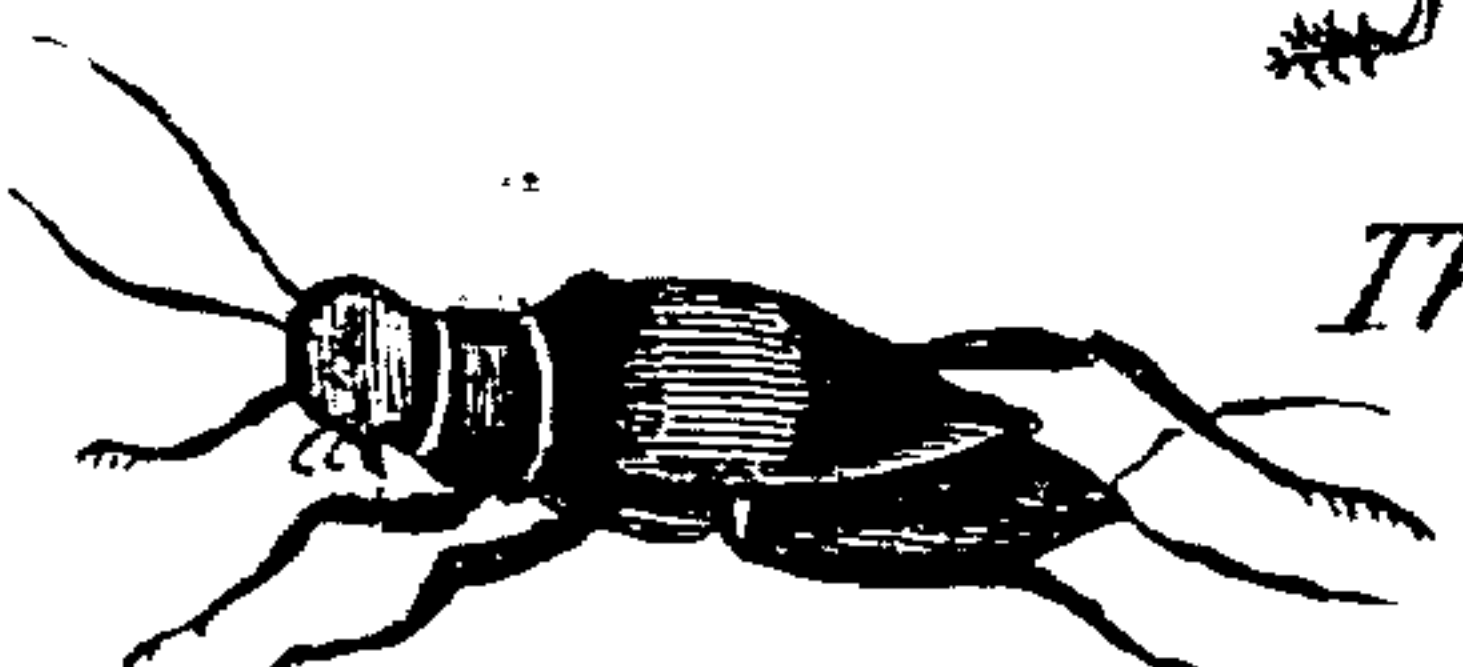
The great Green Locust



The Long-bodied Mantis



The Common Mantis



The House Cricket



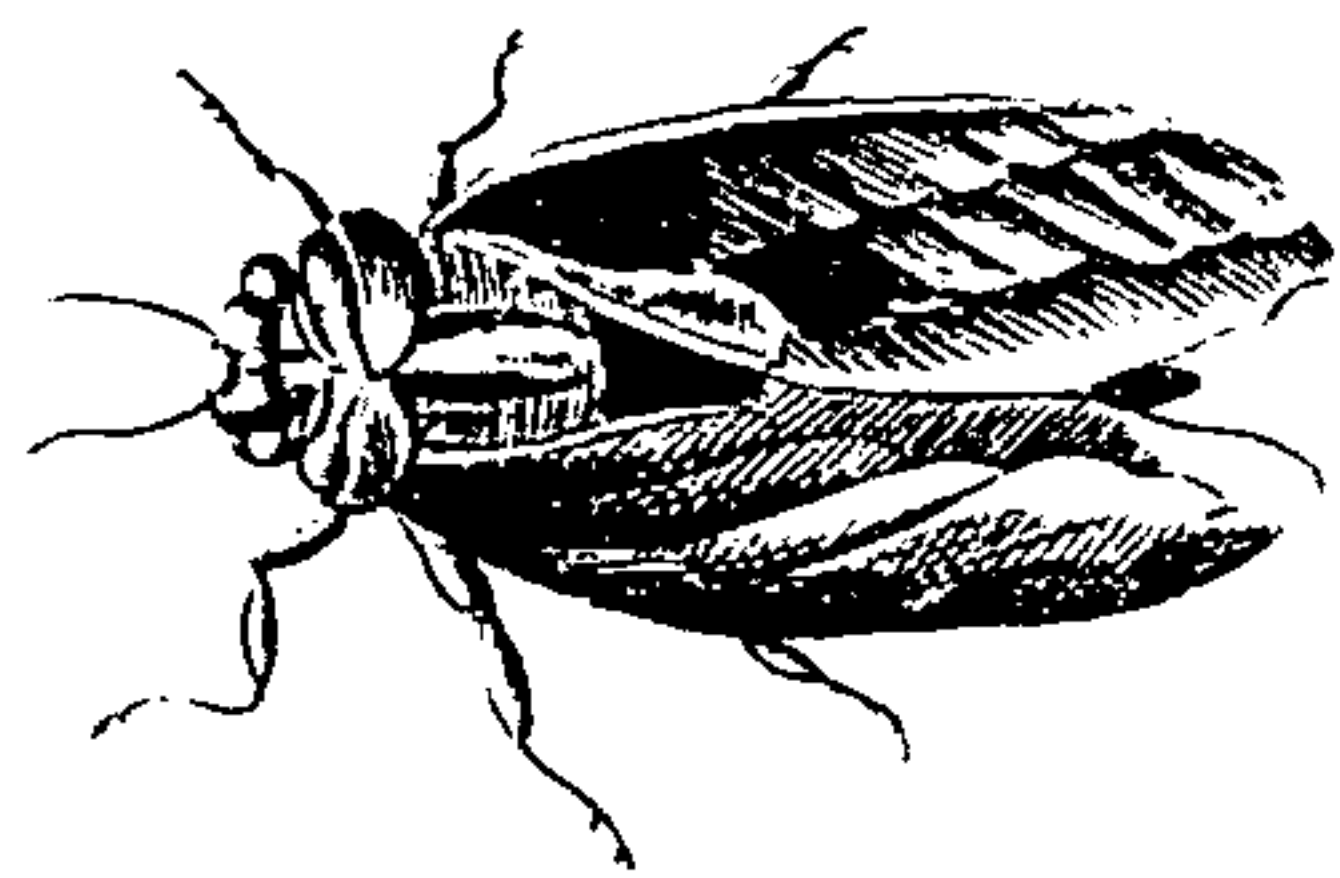
The Field Cricket

10-11-1968

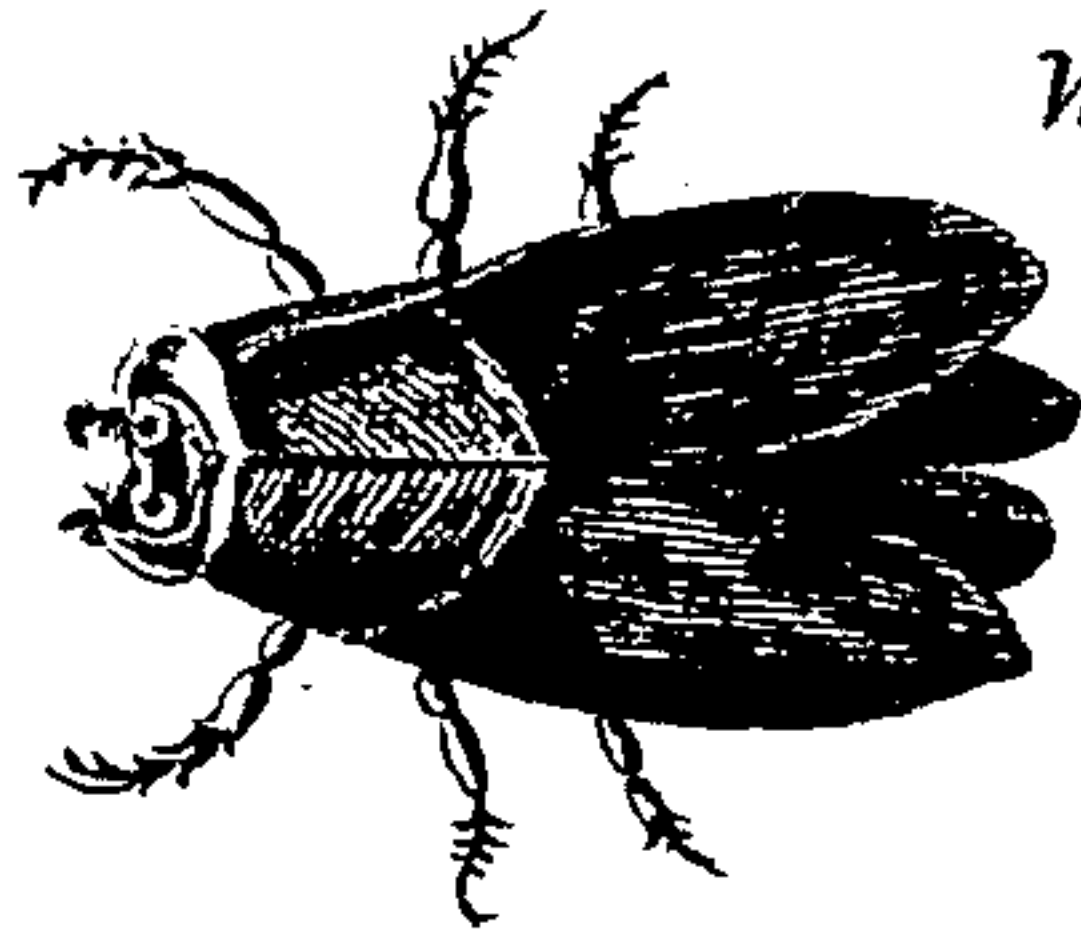
1. *Chlorophyll a* (Chl *a*)

WINGED INSECTS

The common Italian Cicada



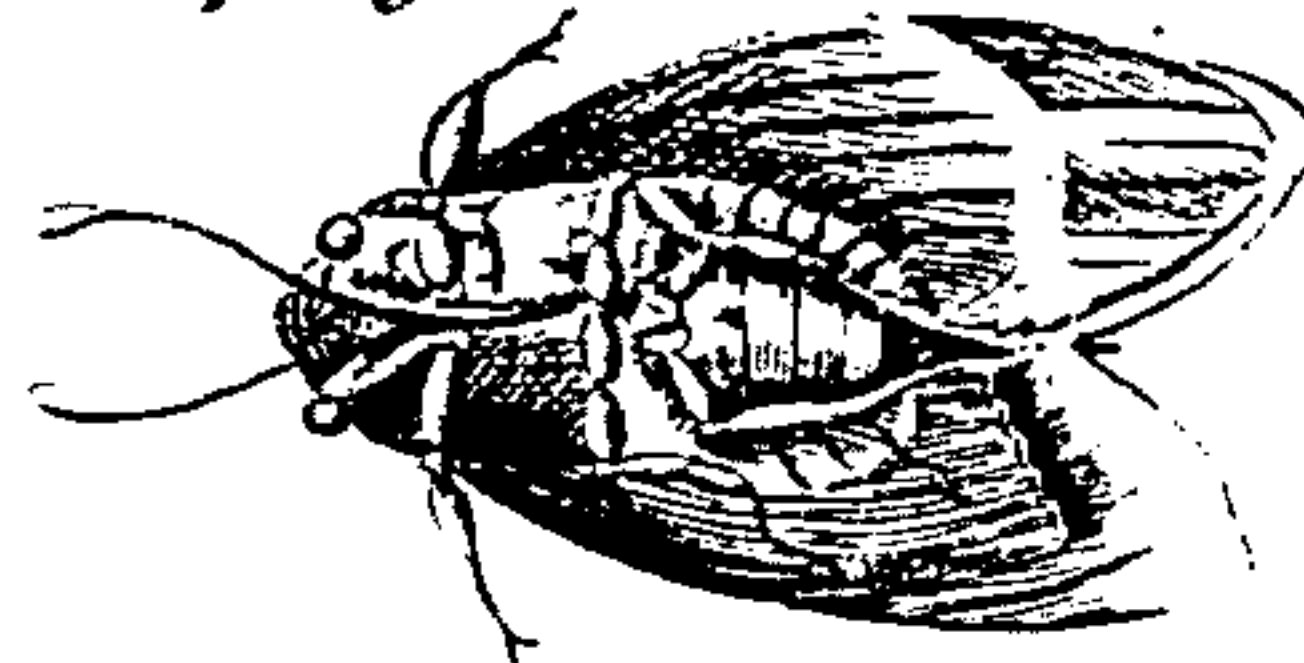
The lesser Italian Cicada



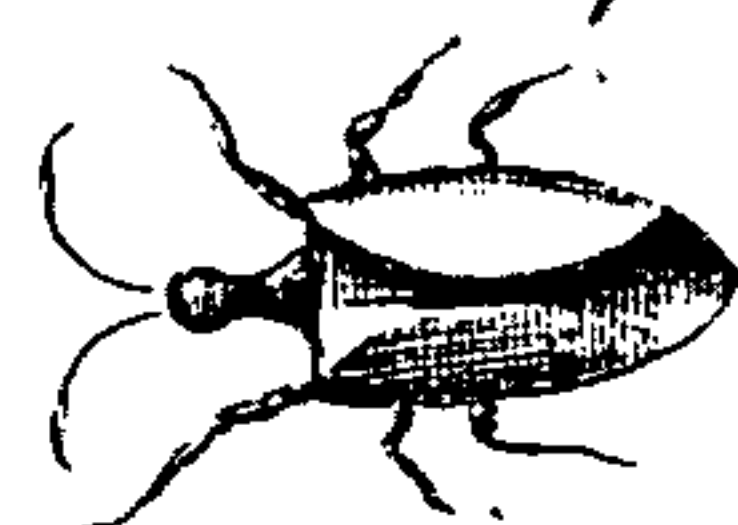
The little Cicada with pale brown wings



The American Laternaria or yellow compress'd Cicada



Cimex Sp.1.



Cimex Sp.5.



Cimex Sp.3.



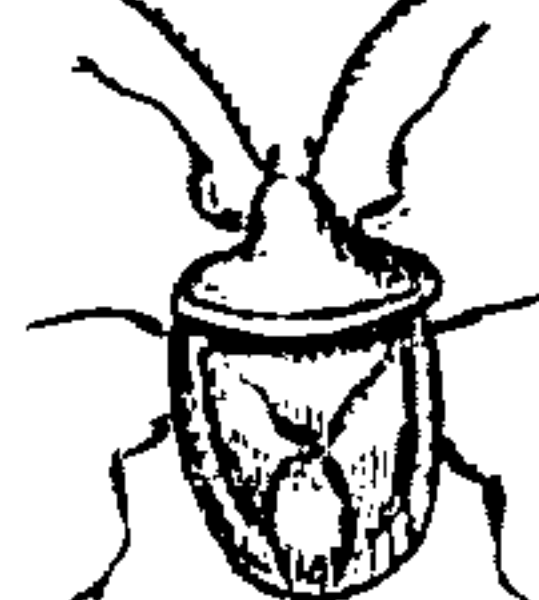
Cimex Sp.11.



Cimex Sp.7.



Cimex Sp.8.



Cimex Sp.9.



Cimex Sp.2.



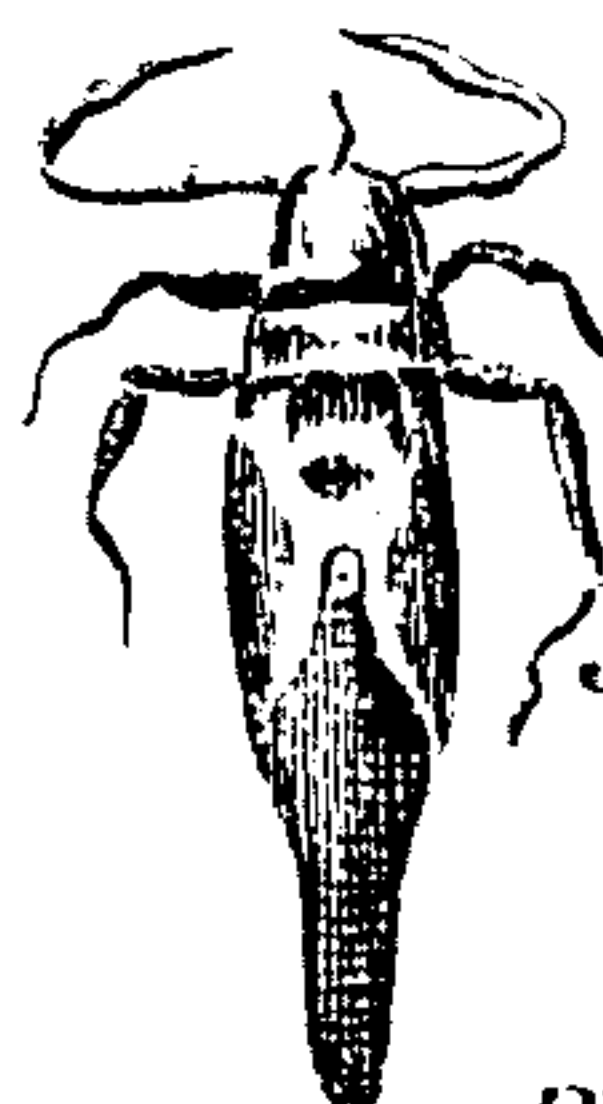
Cimex Sp.1.



Cimex Sp.3.



Notonecta the Boat Fly



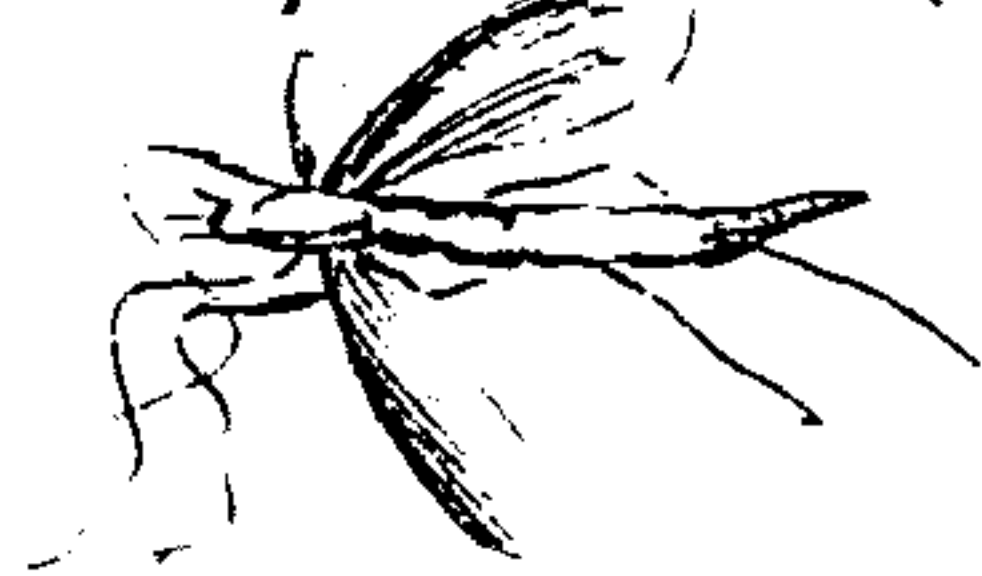
Water Scorpions



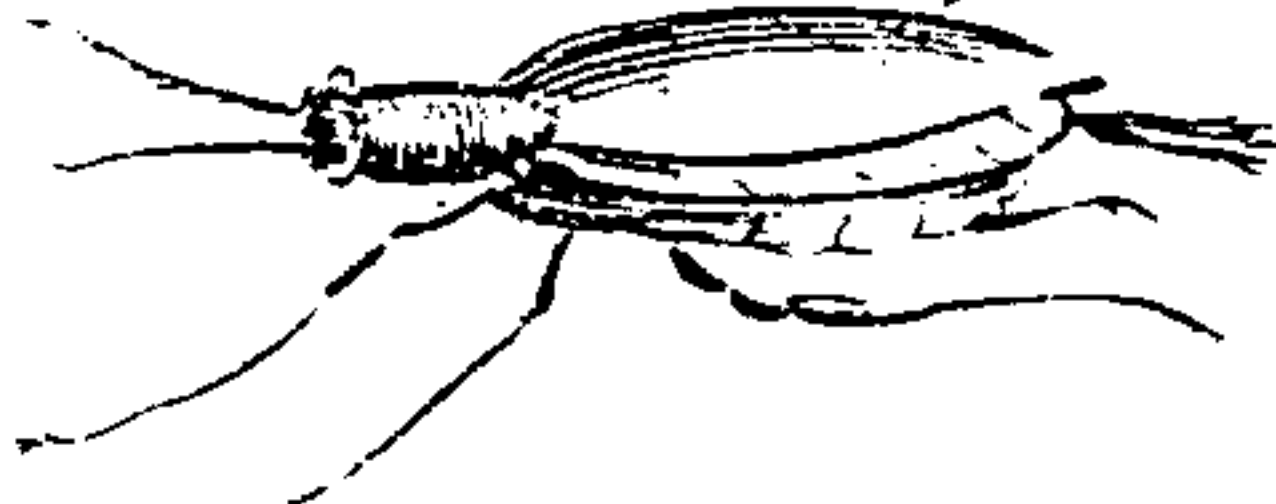
The Scorpion Fly



The Sharp tail'd Fly



Hemerobius Sp. 1.



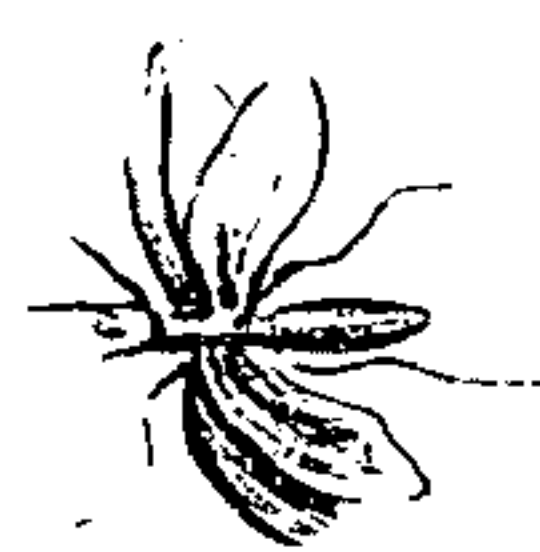
Phryganea Sp.1.



Phryganea Sp.1.



Hemerobius Sp.1.



Ephemera Sp.1.



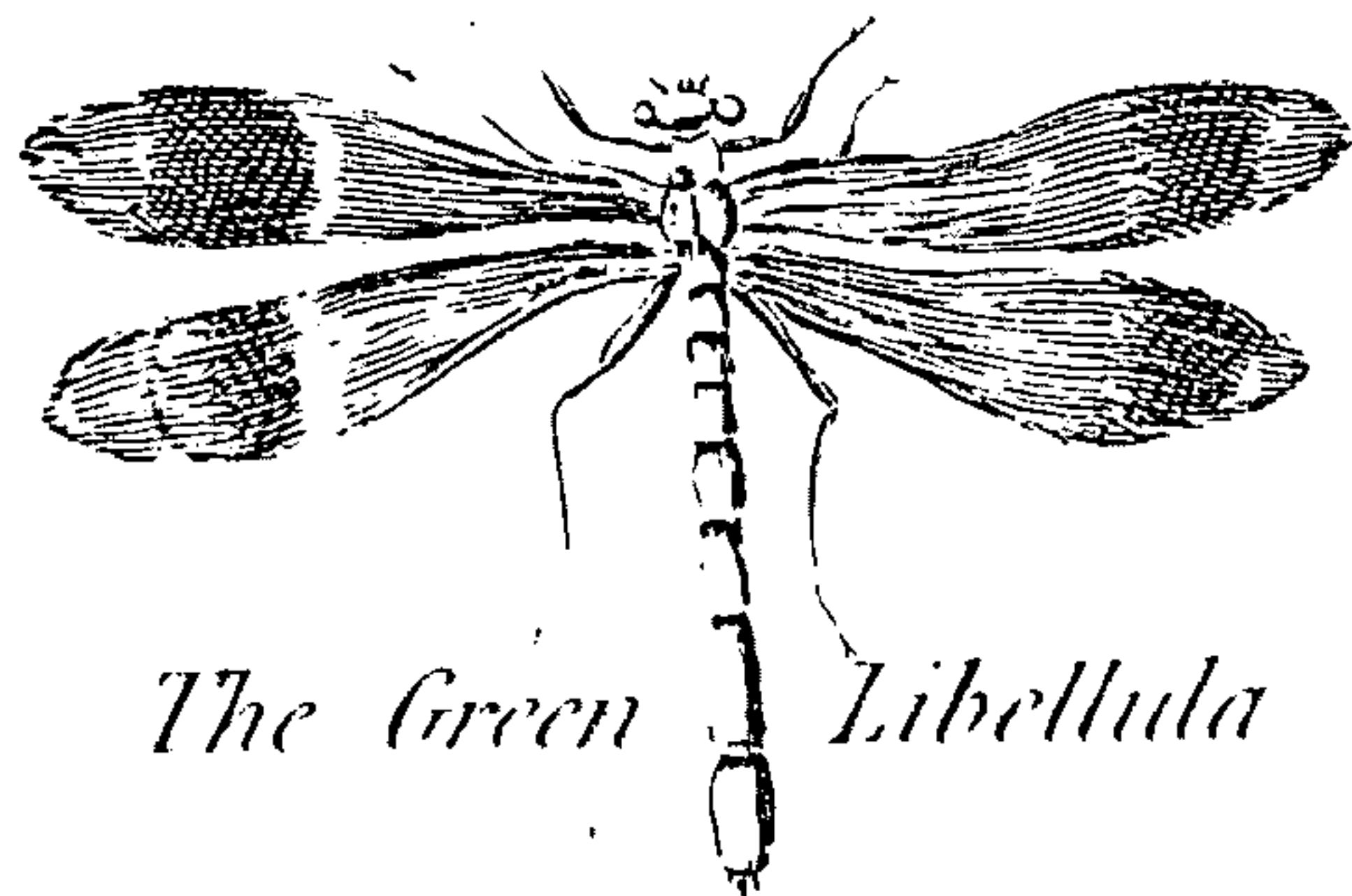
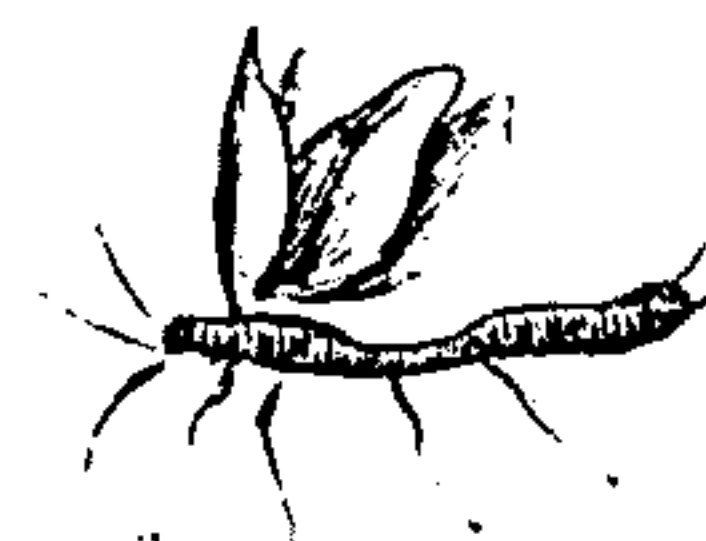
Ephemera



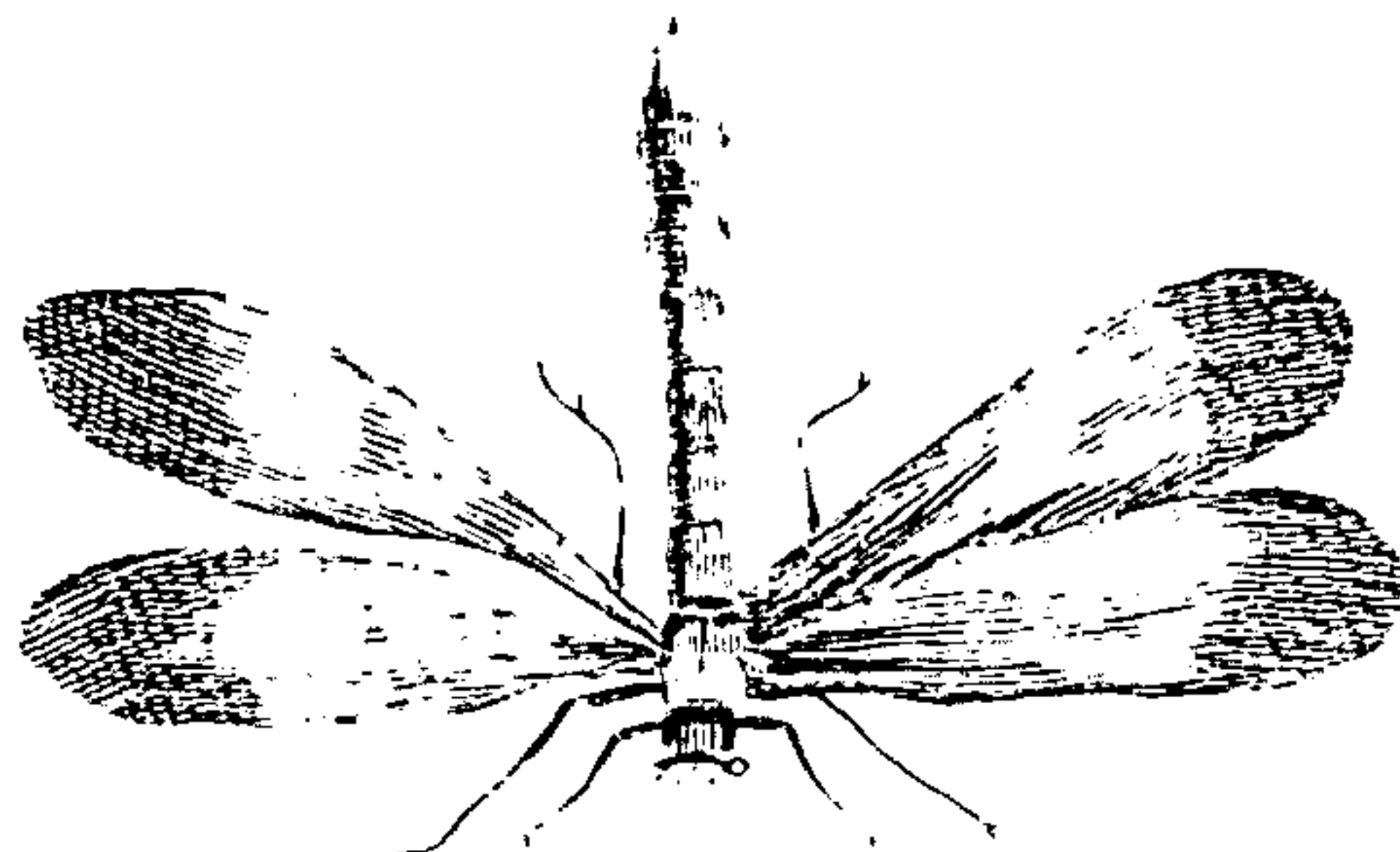
Ephemera Sp.1.



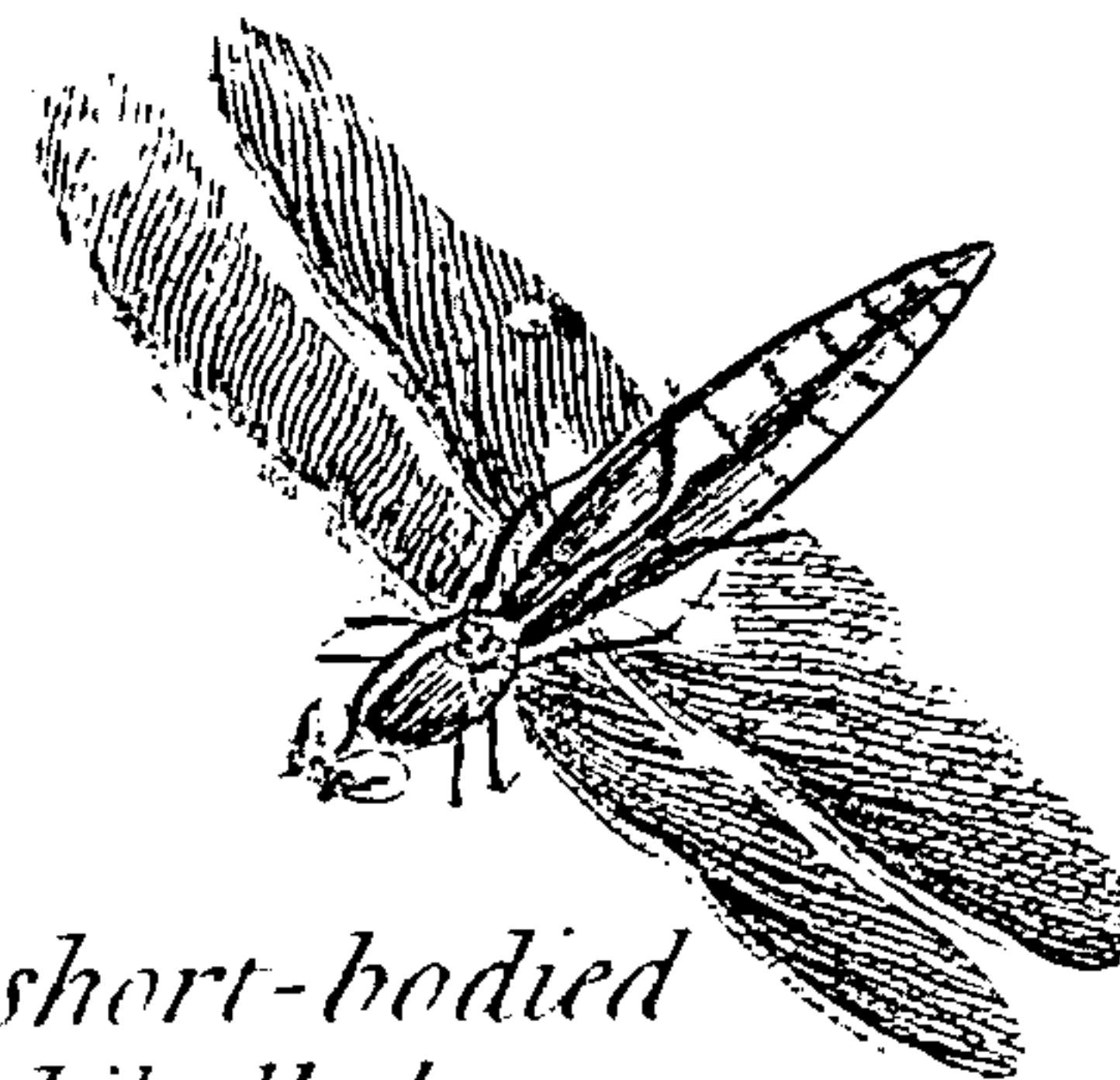
Ephemera



The Green Libellula

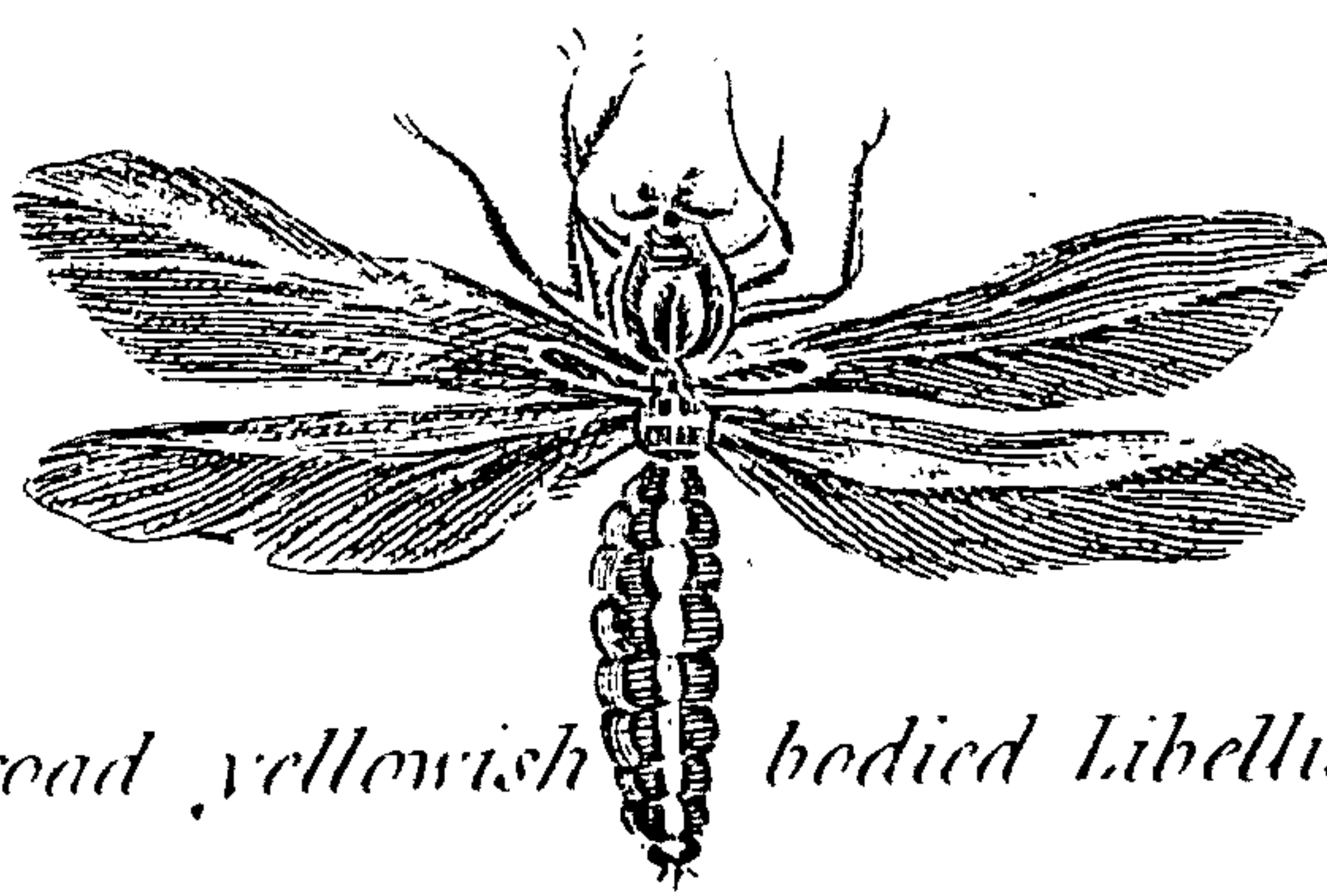


The red-bodied Libellula

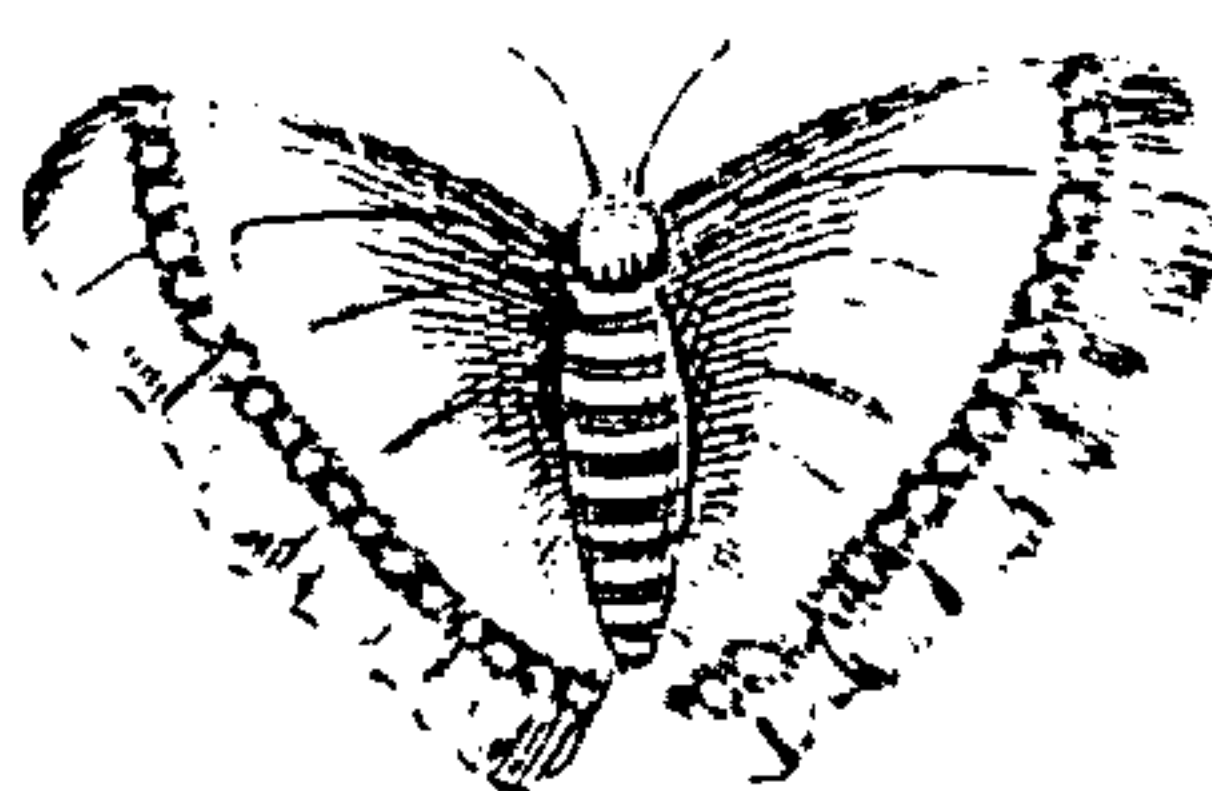


The short-bodied Libellula

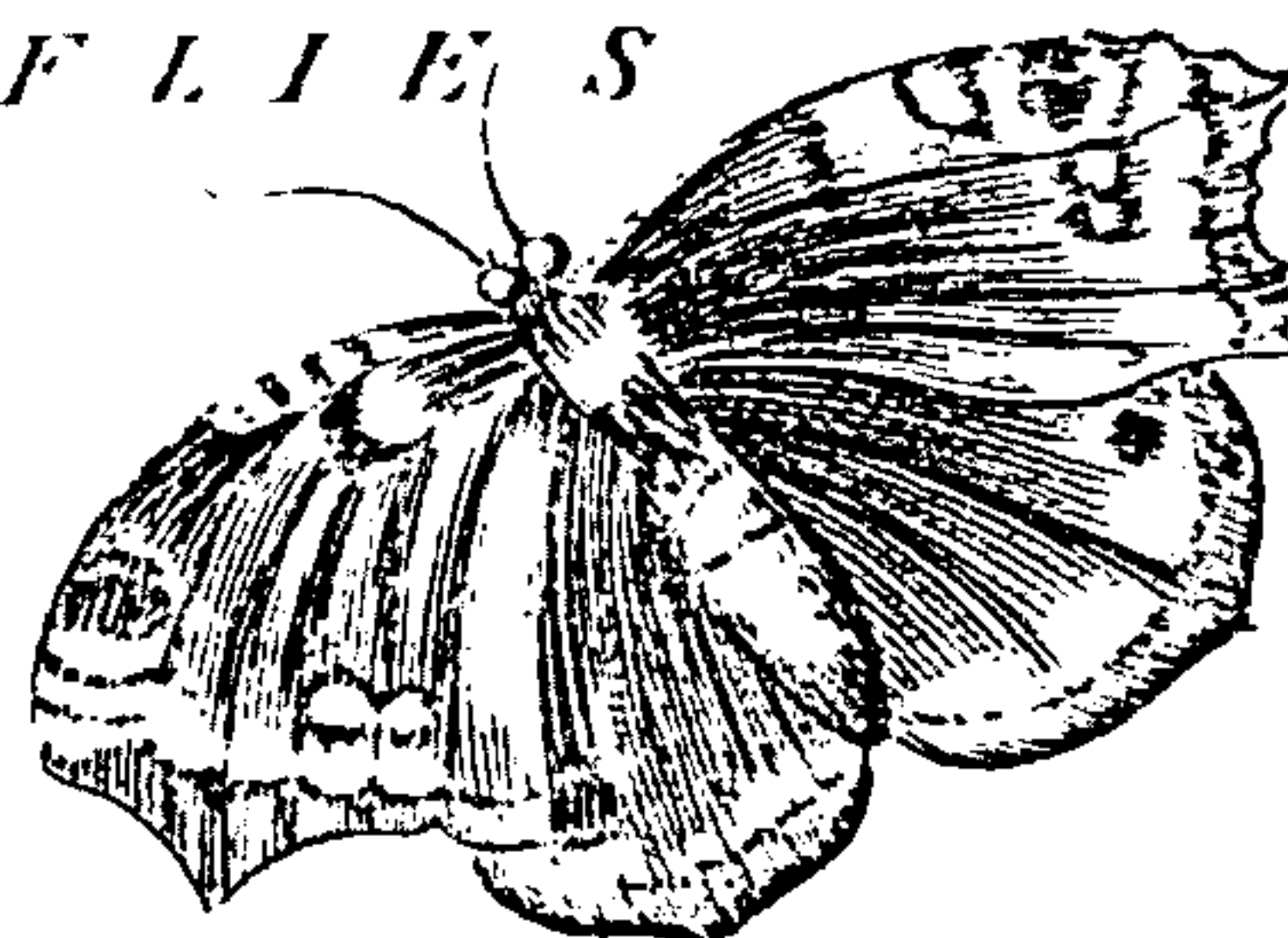
BUTTERFLIES



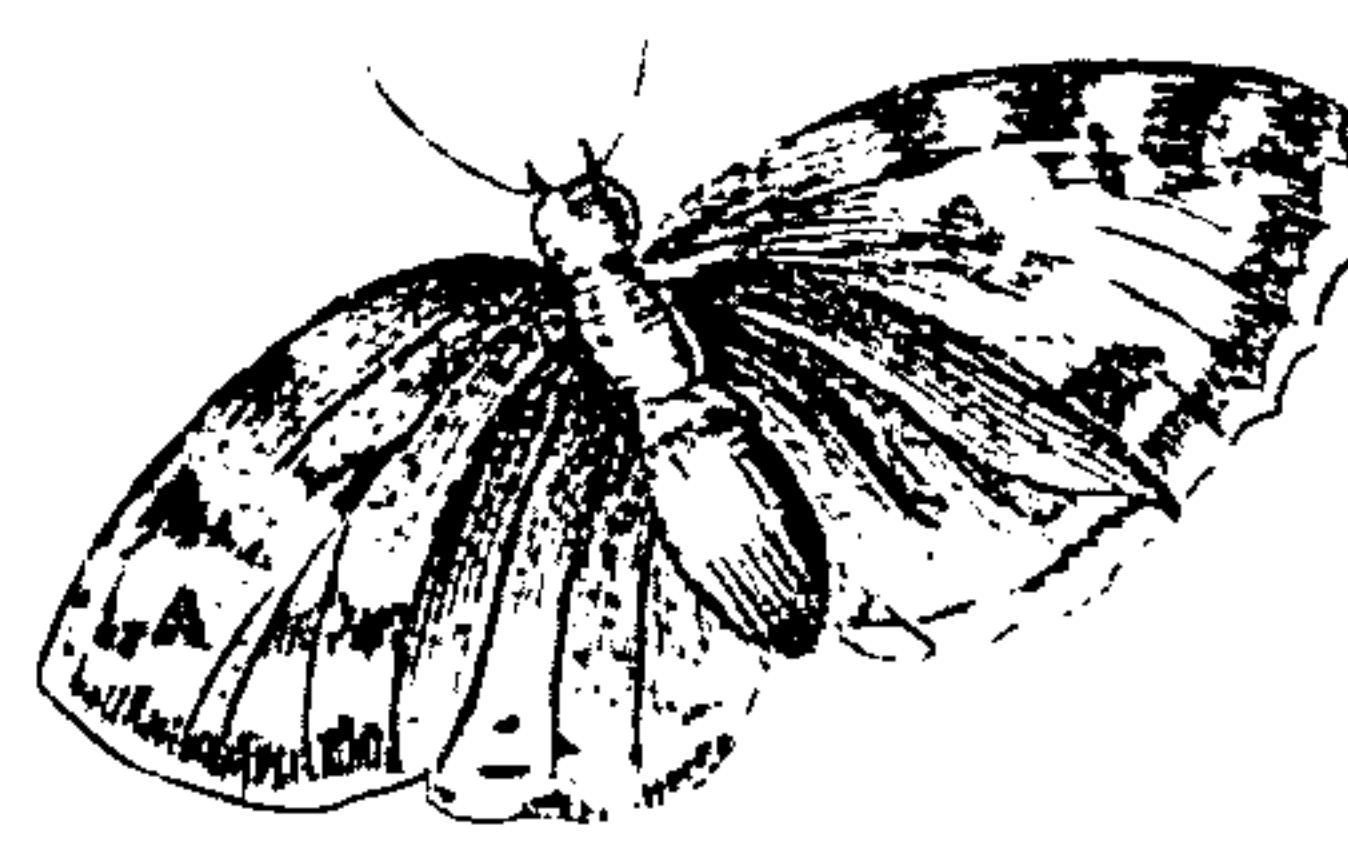
The broad yellowish bodied Libellula



Papilio Sp.11.

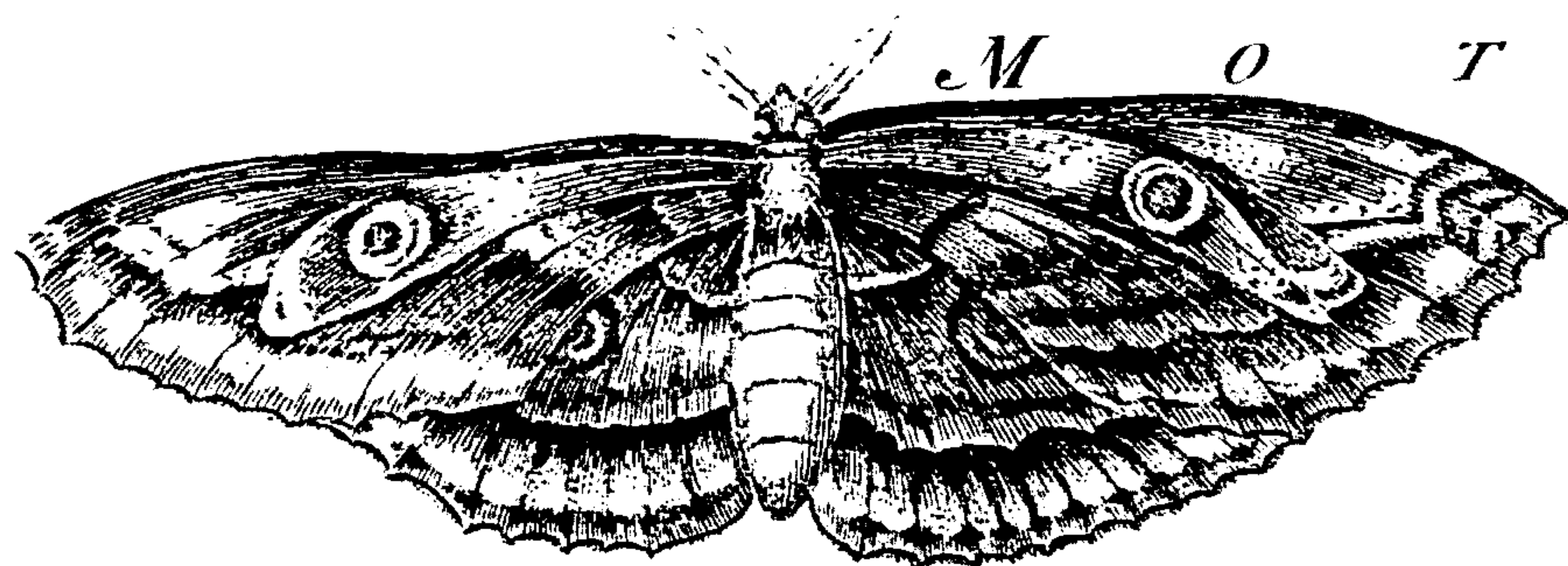


Papilio Sp.2.

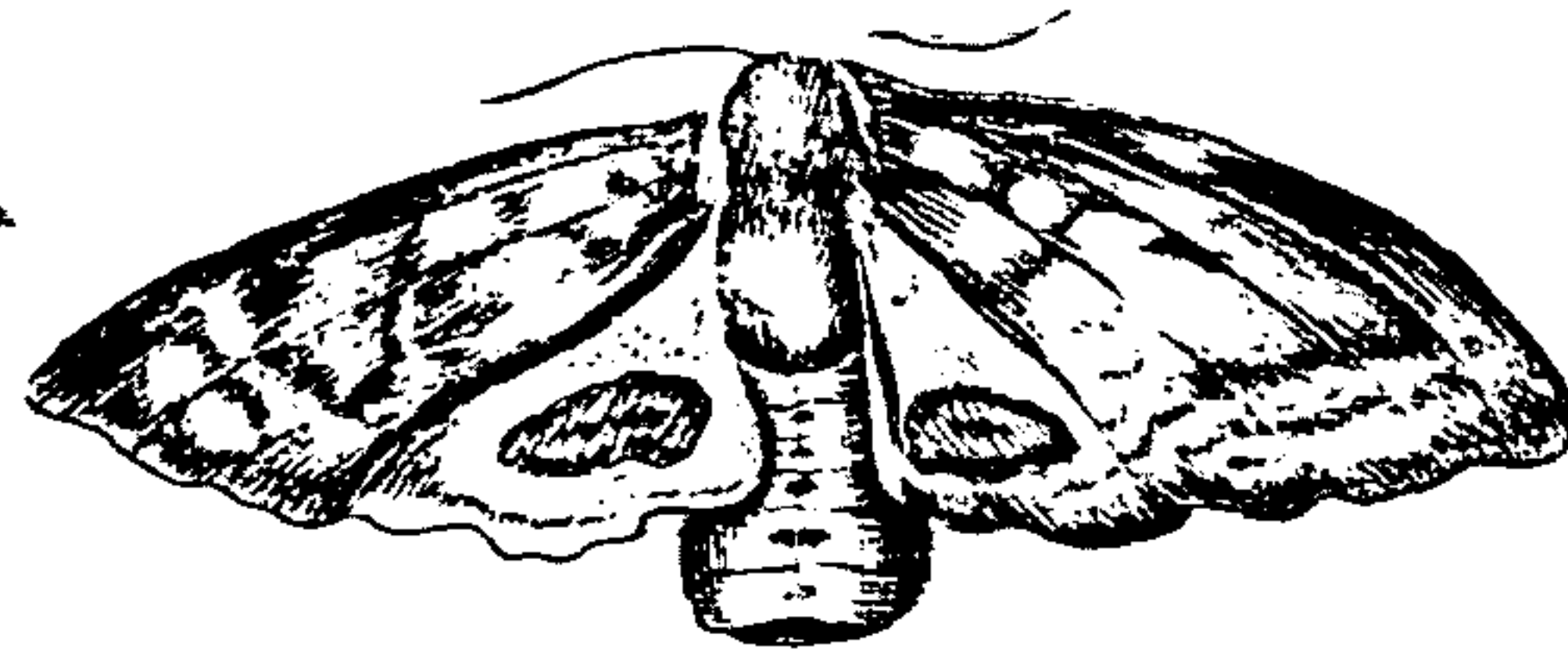


Papilio Sp.9.

M O T H S



Phalaena Sp.6.



Phalaena Sp.10.



Phalaena Sp.11.



Tenthredo Sp.9.



The Yellow Ichneumon Fly



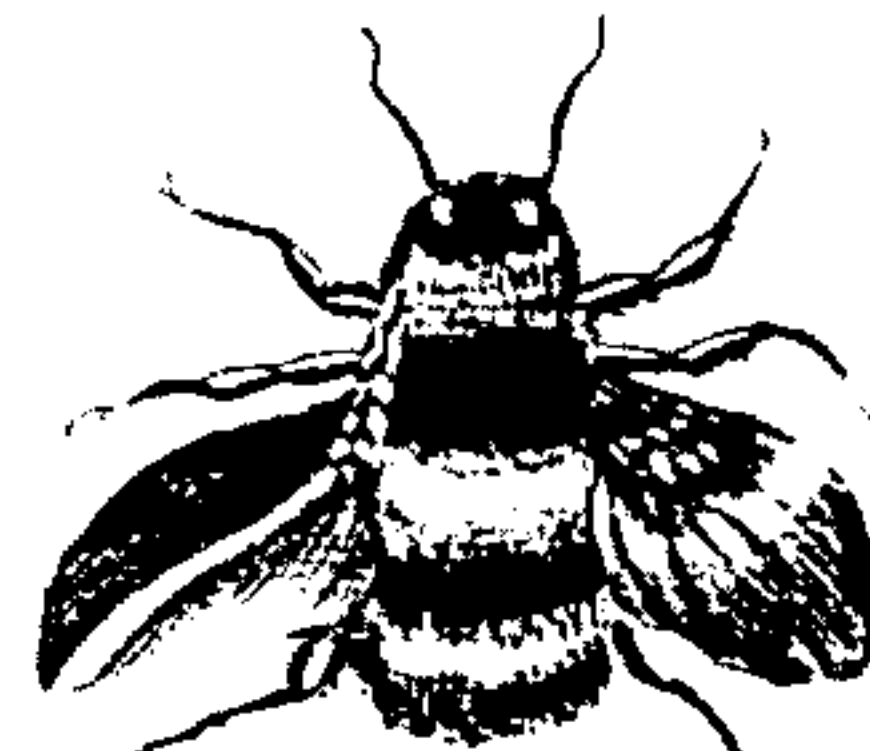
The Green & Yellow Bee



Apis Sp.18.



Apis Sp.13.



The Great Humble Bee



Formica Sp.5.

[illegible]

Moths. All this class have from eight to sixteen feet; and the animal into which they are converted is always a Butterfly or a Moth. It is well known, that all these little animals are hatched from the eggs of Butterflies, and, during winter, the greatest number of Caterpillars are in an egg state. When it has strength to break its shell, it always finds its favourite aliments provided in abundance before it.

The body of a Caterpillar is composed of rings, which are generally twelve in number; by which they may be distinguished from any other insects that resemble them. The head is connected to the first ring by the neck: the jaws are placed rather vertically, and each jaw is armed with a large thick tooth. With these the animals devour their food in amazing quantities. A single Caterpillar will eat double its own weight of leaves in a day, without appearing to be disordered by the meal.

With regard to their external figure, Caterpillars are either smooth or hairy; they have in general six small black spots on the circumference of the fore ring; three of which are larger than the rest, which Reaumur supposes to be eyes. This insect has nine holes on each side of the body, through which it is supposed to breathe; they are called the stigmata.

The life of the Caterpillar seems to be one continued succession of changes, and, before the great metamorphosis, changes its skin eight or ten times. At length it becomes an aurelia; and one would imagine, that they were conscious of the precise time of their continuance in their aurelia state; their little sepulchres, with respect to their solidity, being proportioned to such duration. At length the Butterfly bursts from its aurelia skin, and decorates our fields with its symmetry and beauty.

The number of Butterflies is very great: Linnaeus has reckoned up above seven hundred and sixty different kinds, and the catalogue is still very incomplete. Those of the warmer climates, however, are larger and more beautiful than such as are bred at home.

It is not by day alone that these animals are seen fluttering wantonly from flower to flower, as the greatest number of them fly by night, and expand the most beautiful colouring, at those hours when there is no spectator. They are therefore divided into diurnal and nocturnal flies; or Butterflies and Moths. They may be readily distinguished from each other by their horns or feelers: those of the Butterfly being clubbed or knobbed at the end: and those of the Moth tapering finer and finer to a point. The female Moth lays its eggs soon after it leaves the aurelia, but many of the Butterflies do not think of providing for posterity till the summer is far advanced.

NATURAL HISTORY of the SILKWORM.

THIS little animal, which only works for itself, has been of infinite service to the human race, and furnishes them with a more beautiful covering than can be supplied by any other animal. It is imagined, that Silkworms were not brought into Europe till the beginning of the twelfth century; when Roger of Sicily brought some manufacturers in silk from Asia Minor, on his return from his expedition to the Holy Land, and settled them in Sicily and Calabria. From these this manufacture was taught to the other kingdoms of Europe.

The Silkworm is a large caterpillar of a whitish colour, with twelve feet, and is afterwards transformed into a butterfly of the moth kind. The cone on which it spins, is formed for covering it while it remains in the aurelia state; and several of these, when properly wound off, and united toge-

ther, form those strong and beautiful threads, which are woven into silk: and, as our luxuries are increased, the silk manufacture is become one of the most lucrative of any in the southern provinces of Europe.

Previous to spinning its web, the Silkworm seeks for a convenient place to erect its cell, without any obstruction. Having found a leaf, or a chink fitted to its purpose, it begins to writhe its head in every direction; and fastens its thread on every side to the sides of its retreat.

In the course of a fortnight or three weeks the aurelia is changed into a moth: no sooner is the winged insect completely formed, than having divested itself of its aurelia skin, it prepares to burst through its cone, or outward prison, and by repeated efforts becomes emancipated. This animal, in its fly state, seems produced for no other purpose than to transmit a future brood. It neither flies nor eats; the male only seeking the female; their union continues for about four days without interruption; the male then dies, and the female survives him only till she has laid her eggs; which in the ensuing spring, are hatched into worms.

NATURAL HISTORY of the BEE.

THE Bee is a small and well known insect, famous for its industry.

This useful and laborious insect is divided by two ligaments into three parts or portions, the head, the breast, and the belly. The head is armed with two jaws and a trunk; the former of which play like two jaws opening and shutting to the right and left. The trunk is long and taper, and, at the same time, extremely pliant and flexible, being destined by nature for the insect to probe to the bottom of the flowers, through all the impediments of their chives and foliage; and drain them of their treasured sweets: but were this trunk to be always extended, it would prove incommodious, and be liable to be injured by a thousand accidents, it is therefore of such a structure, that, after the performance of its necessary functions, it may be contracted, or rather folded up; and besides this, it is fortified against all injuries by four strong scales, two of which closely sheathe it, and the two others, whose cavities and dimensions are larger, encompass the whole. From the middle part or breast of the Bee grow the legs, which are six in number: and at the extremity of the paws are two little hooks, discernible by the microscope, which appear like sickles, with their points opposite to each other. The wings are four, two greater and two smaller, which not only serve to transport them through the air, but, by the noise they make, to give notice of their departure and arrival, and to animate them mutually to their several labours. The hairs with which the whole body is covered, are of singular use in retaining the small dust that falls from the chives of the flowers, of which the wax is formed. The belly of the Bee consists of six rings, which slide over one another, and may be lengthened or contracted at pleasure; and the inside of this part of the body contains the intestines, the bag of honey, the bag of poison, and the sting. The office of the intestines is the same as in other animals. The bag of honey is transparent as crystal, containing the sweet juices extracted from flowers; which the Bee discharges into the cells of the magazine for the support of the community in winter. The bag of poison hangs at the root of the sting, through the cavity of which, as through a pipe, the Bee ejects some drops of this venomous liquor into the wound, and so renders the pain more excessive. The mechanism of the sting is admirable, being composed of two darts, enclosed within

within a sheath that tapers into a fine point, near which is an opening to let out the poison. The two darts are ejected through another aperture, which, being armed with several sharp beards like those of fish-hooks, are not easily drawn back again by the Bee; and indeed she never disengages them, if the wounded party happens to start and put her into confusion; but if one can have patience to continue calm and unmoved, she clinches those lateral points round the shaft of the dart, by which means she recovers her weapons, and gives less pain to the person stung. The liquor which at the same time she infuses into the wound, causes a fermentation, attended with a swelling, which continues several days; but that may be prevented by immediately pulling out the sting, and enlarging the puncture, to let the venomous matter have room to escape.

Let us now consider the generation, polity, and labours of these insects, the true knowledge of which is very much owing to the modern invention of glass hives, through which all the secrets of the community are laid open to a curious observer. Any person who carefully examines a hive at different seasons of the year will distinguish three sorts of Bees; of which the far greater number are the common working Bees, who do all the business of the hive, and seem to be neither male nor female. The working Bee. The second sort, called drones, are the males, and somewhat larger than the former; they have no sting, nor ever stir from the hive, but live upon the honey prepared by the others. The third sort is a much larger and longer bodied Bee, of which there are often but one in every swarm or colony of young Bees, who are from time to time detached from the hive in search of another habitation. This large Bee is what the ancients called the king, from the respect they always saw paid to it by the other Bees; but being the female, the moderns more properly give the title of queen, or mother of the swarm.

When these industrious insects begin their works, it is observed they are divided into four parties, one of which is destined to the fields to provide materials for the structure; the second works upon those materials, and forms them into a rough sketch of the dimensions and partitions of the cells; the third examines and adjusts the angles, removes the superfluous wax, polishes the work, and gives it its necessary perfection; and the fourth is employed in bringing provisions to the labourers that build them, because polishing is not so laborious. They begin their work at the top of the hive, continuing downwards to the bottom, and from one side to another; and to make it the more solid, they use a sort of tempered wax, resembling glue. The form of the cells of the honey-comb is hexagonal, which figure, besides what is common with a square and equilateral triangle, has the advantage of including a greater space within the same surface.

The expedition of the Bees in their labour, is almost incredible; for notwithstanding the elegance and just proportions of the work, they are so indefatigable, that they will, in one day, finish a honey-comb a foot long, and six inches broad, capable of receiving three thousand bees.

When the cells are completed, the queen takes possession of those she likes best to deposit her eggs in, and the rest are left to be filled with honey. She lays one egg in each cell, and sometimes more than an hundred of those eggs in a day; but what is still more remarkable, she lays those eggs which are to produce common Bees, in cells of the common shape and size; those that are to become drones or males, in the cells of a larger size; and deposits those which are to become females, like herself, in the spheroidal cells already described.

These eggs, after lying some time in the cells, are

hatched into maggots, and fed with honey ten or twelve days, after which, the other bees close up the cells with a thin piece of wax; and under this covering they become gradually transformed into Bees, in the manner as silk-worms are into butterflies. Having undergone this change, the young Bees pierce through their waxen doors, wipe off the humidity from their little wings, take their flight into the fields, rob the flowers of their sweets, and are perfectly acquainted with every necessary circumstance of their future conduct. As to the males or drones, which are destined only to propagate their species, they live very comfortably for about three months after they are hatched; but when that time is over, and the females are impregnated, the common Bees either kill them, or drive them from the hive, as burthensome to the community, and not a drone is to be found till the next season.

It is an excellent observation of a modern author, that the hive is a school to which numbers of people ought to be sent; prudence, industry, benevolence, public spiritedness, œconomy, neatness, and temperance, are all visible among the Bees. These little animals are actuated by a social spirit, which forms them into a body politic, intimately united, and perfectly happy. They all labour for the general advantage; they are all submissive to the laws and regulations of the community: having no particular interest, no distinction but those which nature or the necessities of their young have introduced amongst them. They are free, because they only depend on the laws; they are happy, because the concurrence of their several labours inevitably produces abundance, which contributes to the riches of each individual. Let us compare human societies with this, and they will appear altogether monstrous. Necessity, reason, and philosophy, have established them for the commendable purposes of mutual aid and benefits: but a spirit of selfishness destroys all; and one half of mankind, to load themselves with superfluities, leave the other destitute of common necessities.

When the hive is become too much crowded, by the addition of the young brood, a part of the Bees think of finding themselves a more commodious habitation, and with that view single out the most forward of the young queens. A new swarm is, therefore, constantly composed of one queen at least, and of several thousand working Bees, as well as of some hundreds of drones. The working Bees are some old, some young.

The usual method of uniting swarms is very easy. Spread a cloth at night upon the ground close to the hive in which the two casts or swarms are to be united; lay a stick across this cloth; then fetch the hive with the new swarm, set it over the stick, give a smart stroke on the top of the hive, and all the Bees will drop down upon the cloth in a cluster. This done, throw aside the empty hive, take the other from off the stool, and set this last over the Bees, who will soon ascend into it, mix with those already there, and become one and the same family. Others, instead of striking the Bees down upon the cloth, place with its bottom upmost the hive in which the united swarms are to live, and strike the Bees of the other hive down into it. The former of these hives is then restored to its natural situation, and the Bees of both hives soon unite. If some Bees still adhere to the other hive, they may be brushed off on the cloth, and they will soon join their brethren. Or one may take the following method, which gives less disturbance to the Bees. Set with its mouth upmost the hive into which the young swarm has been put, and set upon it the other hive. The Bees in the lower hive, finding themselves in an inverted situation, will soon ascend into the upper.

Columella directs, that the apiary, or Bee-garden, face the south, in a place neither too hot, nor too much exposed to the cold; that it be in a valley, in order that the loaded Bees may with the greater ease descend to their homes; that it be near the mansion-house, on account of the conveniency of watching them, but so situated as not to be exposed to noisome smells, or to the din of men or cattle; that it may be surrounded with a wall, which, however, should not rise above three feet high; that, if possible, a running stream be near them, or, if that cannot be, that water be brought near them in troughs, with pebbles or small stones in the water, for the Bees to rest on whilst they drink; or that the water be confined within gently declining banks, in order that the Bees may have safe access to it; they not being able to produce either combs, honey, or food for their maggots, without water. That the neighbourhood of rivers or basons of water with high banks be avoided, because winds may whirl the Bees into them, and they cannot easily get on shore from thence to dry themselves; and that the garden in which the apiary stands be well furnished with such plants as afford the Bees plenty of good pasture. The trees in this garden should be of the dwarf kind, and their heads bushy, in order that the swarms which settle on them may be the more easily hived.

We come now to explain the most inhuman method commonly practised of taking Bees, which consists in wantonly destroying the whole swarm, in order to enjoy the fruits of their labours.

Were we to kill the hen for her egg, the cow for her milk, or the sheep for the fleece it bears, every one would instantly see how much we should act contrary to our own interest: and yet this is practised every year in regard to Bees. Would it not argue more wisdom in us to be contented with taking away only a portion of their wax and honey, as is the practice of many countries? The common method here is, that when those which are doomed for slaughter have been marked out (which is generally done in September) a hole is dug near the hive, and a stick, at the end of which is a rag that has been dipped in melted brimstone, being stuck in that hole, the rag is set on fire, the hive is immediately set over it, and the earth is instantly thrown up all around, so that none of the smoke can escape. In a quarter of an hour, all the Bees are seemingly dead; and they will soon after be irrecoverably so, by being buried in the earth that is returned back into the hole: they will soon be absolutely killed by this last means; because it has been found, by experiment, that all the Bees which have been affected only by the fumes of the brimstone, recover again, excepting such as have been singed or hurt by the flame. Hence it is evident, that the fume of brimstone might be used for intoxicating the Bees, with some few precautions. The heaviest and the lightest hives are alike treated in this manner; the former, because they yield the most profit, with an immediate return; and the latter, because they would not be able to survive the winter. Those hives which weigh from fifteen to twenty pounds, are thought to be the fittest for keeping.

The practice of the ancients was, however, very different from this: they were content to share with these industrious insects the produce of their labours; and some very laudable attempts have been made in our own country, to attain the desirable end of getting the honey and wax, without destroying the Bees. John Geddy, Esq. published in the year 1665, his invention of boxes for preserving the lives of Bees. These were improved by Joseph War-der, physician, at Croydon, who at the same time embellished his account of the structure and use of

these boxes, with several other curious circumstances concerning Bees, in his work, intitled, *The True Amazons, or the Monarchy of Bees*. Two very worthy clergymen, the Rev. Mr. John Thorley, of Oxford, and the Rev. Mr. Stephen White, M. A. Rector of Holton, in Suffolk, have brought the method of preserving the lives of Bees to still greater perfection.

The indefatigable Mr. Wildman, so universally known for his curious experiments with Bees, has obliged the world with the following method of taking the wax and honey, without destroying the Bees:

Remove, says he, the hive from which you would take the wax and honey, into a room, into which admit but little light, that it may at first appear to the Bees as if it were late in the evening. Gently invert the hive, placing it between the frames of a chair, or other steady support, and cover it with an empty hive, keeping the side next the window of the empty hive raised a little, to give the Bees sufficient light to get into it. While you hold the empty hive steadily supported on the edge of the full hive, between your side and your left arm, keep striking with your other hand all round the full hive from top to bottom, in the manner of beating a drum, so that the Bees may be frightened by the continual noise from all quarters; and they will in consequence mount out of the full hive into the empty one. Repeat the strokes rather quick than strong round the hive, till all the Bees are got out of it, which will generally be in about five minutes. It is to be observed, that the fuller the hive is of Bees, the sooner they will have left it. As soon as a number of them have got into the empty hive, it should be raised a little from the full one, that the Bees may not continue to run from the one to the other. As soon as all the Bees are out of the full hive, the other, in which the Bees are, must be placed on the stand from which the former hive was taken, in order to receive the absent Bees as they return from the fields.

If this be done early in the season, the operator should examine the royal cells; for if any of them contain young Bees, they must, as well as all the combs that have young Bees in them, be saved in the hive. Take out the other combs with a long broad and pliable knife; cutting them from the sides and crown as clean as possible, to save the future labours of the Bees, who must lick up the honey spilt, and remove every grain of wax: the sides of the hive should then be scraped with a table-spoon, to clear away what was left by the knife.

Having thus finished taking the wax and honey, let a table covered with a clean cloth, be placed near the stand, and giving the hive in which the bees are a sudden shake, striking it at the same time pretty forcibly, the Bees will be shaken on the cloth. Put their own hive over them immediately, raised a little on one side, that the Bees may the more easily enter, and when all are entered, place it on the stand as before. If the hive in which the Bees are, be turned uppermost, and their own hive placed over it, the Bees will immediately ascend into it, especially if the lower sides be struck to alarm them: for the effects of fear impressed on the Bees, by the continual noise, renders them for a considerable time so mild and tractable, that they will bear any handling, which does not hurt them, without any shew of resentment.

NATURAL HISTORY of the WASP and HORNET.

THOUGH the bee and the Wasp resemble each other very strongly, yet they differ very widely in their manner and duration. The Wasp is well known to be a winged insect with a sting: it is longer

longer in proportion than the bee, and is marked with bright yellow circles round the body: it is the swiftest and most active insect of all the fly kind. It has a long tooth on each side of the mouth, with which it is enabled to cut almost any substance, and carry it to its nest.

Like bees, these insects live in community, and sometimes upwards of ten thousand are found inhabiting one nest. Among bees every community is composed of females, or queens, drones or males, and neutral or working bees. The occupations of Wasps are similar; the two first are for propagating the species, the last for defending and nursing the rising progeny. Bees, however, have seldom more than a queen or two in an hive; among Wasps there are two or three hundred. The nest of the Wasp is very curious, the construction of which is not very different from that of the bee; and each cell is hexagonal, like that of the bee.

The Wasps of Europe are very mischievous, but they are innocent when compared to those of the tropical climates, where all the insect tribes are not only numerous, but large, voracious, and formidable. In some of the islands, no precautions can prevent their attacks, and their sting is sometimes as terrible as that of a scorpion.

The Hornet is about twice as large as the Wasp, but strongly resembles it in shape. It has four wings, those above being double the size of those below. It makes a greater noise in flying than a Wasp, and is a very troublesome and dangerous insect.

NATURAL HISTORY of the ICHNUMON FLY.

THERE are many different kinds of this insect, but that which is the most formidable, is called the common Ichnumon. The body is long, slender, and black: the head, breast, feelers, and weapon at the tail, are of the same colour: it has four wings, like the bee, which are transparent, with a black spot near the edge of each. The weapon at the tail is longer than the body, and consists of three parts like hairs. Ray calls it the Wasp Ichnumon. This creature is a dreadful enemy to the insect tribe, but a particular friend to mankind. The millions it destroys in a summer are inconceivable; and without such a destroyer, the fruits of the earth would only furnish a banquet for the insect race.

NATURAL HISTORY of the ANT.

THESE insects are famous from all antiquity for their social and industrious habits: they are offered as a pattern of parsimony for the profuse, and of unremitting diligence to the sluggard. It is, however, surprising that all the writers of antiquity should describe this insect as labouring in the summer, and feasting upon the produce during the winter; it being well known that they require no supply of winter provisions, as they are actually in a state of torpidity during that season. But this may not, perhaps, be the case in some of the warmer climates, where the winter is mild.

The common Ants are of two or three different kinds; some are red, others black; some have stings, others have none. Such as have stings, inflict their wounds with them; such as have not, spirt from their hinder parts an acid pungent liquor. The body of an Ant is divided into the head, breast, and belly. The eyes are black, and under them are two small horns or feelers. The breast is covered with a fine silky hair, from which project six legs, the extremities of each have two small claws. The body is of a brown chestnut colour, somewhat reddish about the belly. Like bees, they are divided into

males, females, and the neutral or working tribe. The females are larger than the males, and the working Ants are the smallest of all. The former, in general, have wings, the latter never have any; and upon them are devolved all the labours that tend to the welfare of the community. The males and females mix with the working multitude, but seem no way to partake in the common drudgeries of the state.

The fond attachment which the working Ants shew to the rising progeny is amazing: in cold weather they convey them in their mouths to the very depths of their habitation, where they are less subject to the severity of the season. In a fine day they remove them nearer the surface, where their maturity may be assisted by the warm beams of the sun.

The Ants of Africa are of three kinds; the red, the green, and the black; the latter is a very formidable insect, and above an inch in length. Their sting produces great pain, and their depredations are sometimes extremely destructive. From their hills, which are from six to twelve feet high, they fall out in a body in quest of adventures, and sometimes sheep, fowls, and even rats, are killed and devoured by these merciless insects.

NATURAL HISTORY of the BEETLE.

THERE are various kinds of the Beetle, all concurring in one common formation of having cases to their wings. Such a covering is the more necessary to these insects, as they sometimes live under the surface of the earth, in holes which are made by their own industry. The May-bug or dorr-beetle is so well known as to require no description. The elephant Beetle is the largest of this kind hitherto known; it is found in South-America, particularly Surinam, and about the river Oroonoko. It is black, and the whole body is covered with a hard shell. Its length from the hinder part to the eyes, is about four inches. The cantharis is of the Beetle kind, from whence come cantharides, well known by the name of Spanish flies, and for their use in blisters. Some are of a pure azure colour, others of pure gold, and others of a mixture of both. They are chiefly natives of Spain, Italy, and Portugal. The cochineal is an insect of a scarlet colour within, and without of a blackish red; sometimes of a white reddish or ash-colour, which are accounted the best, and are brought us from Mexico. These insects are used both in dying and in medicine.

NATURAL HISTORY of the GNAT and the TIPULA.

THE Tipula, or long legs, and the larger kind of Gnat, have frequently been mistaken for each other; they are both mounted on long legs, both furnished with two wings and a slender body: the principal difference is, that the Tipula wants a trunk, and the Gnat has a large one, which it often exerts to very mischievous purposes; but the Tipula is peaceful and innocent. The Gnat of Europe, indeed, gives but little uneasiness; but it is very different in America, where the waters stagnate, and the climate is warm, and where they are produced in multitudes beyond expression. There they are found from six inches in length to a minuteness that requires even the microscope to perceive them. Tho' the suffering inhabitants destroy millions daily, still millions more succeed, and produce unceasing torment.



into pieces; and one animal, by the means of cutting, is divided into two distinct existencies, and sometimes into a thousand. This is the most astonishing phenomenon in all natural history, that man should have a kind of creative power, and out of one life make two, each completely formed, with all its apparatus and functions. This obtains also in the Sea-Worm, the Water-Worm, and in many other of the vermicular species.

When Des Cartes first started the opinion, that brutes were machines, the discovery of this surprising propagation was unknown, which might, in some measure, have strengthened his fanciful theory. What is life, in brutes, he might have said, or where does it reside? In some we find it so diffused, that every part seems to maintain a vivacious principle, and the same animal appears possessed of a thousand distinct irrational souls at the same time. But let us not, he would say, give so noble a name to such contemptible powers, but rank the vivifying principle in these with the sap that rises in vegetables, or the moisture that contracts a cord, or the heat that puts water into motion! Nothing, in fact, deserves the name of soul, but that which reasons, that which understands, and by knowing God, receives the mark of its currency, and is minted with the impression of its great Creator.

Such might have been the speculations of this philosopher: however, to leave theory, it will be sufficient to say, that we owe the first discovery of this power of reproduction in animals, to Mr. Trembley, who first observed it in the polypus; and after him, Spalanzani and others found it taking place in the Earth-Worm, the Sea-Worm, and several other ill-formed animals of a like kind, which were susceptible of this new mode of propagation. This last philosopher, has tried several experiments upon the Earth-Worm, many of which succeeded according to his expectation; every Earth-Worm, however, did not retain the vivacious principle with the same obstinacy; some, when cut in two, were entirely destroyed; others survived only in the nobler part; and while the head was living, the tail entirely perished, and a new one was seen to burgeon from the extremity. But what was most surprising of all, in some, particularly in the small red-headed Earth-Worm, both extremities survived the operation; the head produced a tail with the anus, the intestines, the annular muscle, and the prickly beards; the tail part, on the other hand, was seen to shoot forth the nobler organs, and, in less than the space of three months, sent forth a head, heart, with all the apparatus and instruments of generation. This part, as may easily be supposed, was produced much more slowly than the former, a new head taking above three or four months for its completion, a new tail being shot forth in less than as many weeks. Thus two animals, by dissection, were made out of one, each with their separate appetites, each endued with life and motion, and seemingly as perfect as that single animal from whence they derived their origin.

The Sea-Worm, the White Water-Worm, and many of those little Worms with feelers, found at the bottom of dirty ditches; in all these, the nobler organs are of such little use, that if taken away, the animal does not seem to feel the want of them; it lives in all its parts, and in every part, and by a strange paradox in nature, the most useless and contemptible life, is of all others the most difficult to destroy.

As Worms, like serpents, have a creeping motion, so both, in general, go under the common appellation of reptiles; a loathsome, noxious, malignant tribe, to which man by nature, as well as by religion, has the strongest antipathy. But though Worms, as well as serpents, are mostly without feet,

and have been doomed to creep along the earth on their bellies, yet their motions are very different. The serpent having a back-bone, which it is incapable of contracting, bends its body into the form of a bow, and then shoots forward from the tail; but it is very different with the Worm, which has a power of contracting or lengthening itself at will. There is a spiral muscle, that runs round its whole body, from the head to the tail, somewhat resembling a wire wound round a walking-cane, which, when slipped off, and one end extended and held fast, will bring the other nearer to it; in this manner the Earth-Worm, having shot out, or extended its body, takes hold by the slime of the fore part of its body, and so contracts and brings forward the hinder part; in this manner it moves onward, not without great effort, but the occasions for its progressive motion are few.

As it is designed for living under the earth, and leading a life of obscurity, so it seems tolerably adapted to its situation. Its body is armed with small stiff sharp burs or prickles, which it can erect or depress at pleasure; under the skin there lies a slimy juice, to be ejected as occasion requires, at certain perforations, between the rings of the muscles, to lubricate its body, and facilitate its passage into the earth. It has a mouth, and also an alimentary canal, which runs along to the very point of the tail. In some Worms, however, particularly such as are found in the bodies of animals, this canal opens towards the middle of the belly, at some distance from the tail. The intestines of the Earth-Worm, are always found filled with a very fine earth, which seems to be the only nourishment these animals are capable of receiving.

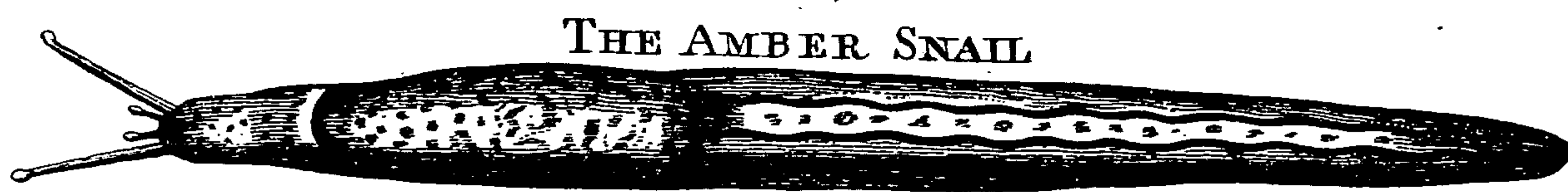
The animal is entirely without brain, but near the head is placed the heart, which is seen to beat with a very distinct motion, and round it are the spermatie vessels, forming a number of little globules, containing a milky fluid, which have an opening into the belly, not far from the head: they are also often found to contain a number of eggs, which are laid in the earth, and are hatched in twelve or fourteen days into life, by the genial warmth of their situation; like snails, all these animals unite in themselves both sexes at once, the reptile that impregnates, being impregnated in turn; few that walk out, but must have observed them, with their heads laid against each other, and so strongly attached, that they suffer themselves to be trod upon.

When the eggs are laid in the earth, which, in about fourteen days, as has been said, are hatched into maturity, the young ones come forth very small, but perfectly formed, and suffer no change during their existence: how long their life continues, is not well known, but it certainly holds for more than two or three seasons. During the winter, they bury themselves deeper in the earth, and seem, in some measure, to share the general torpidity of the insect tribe. In spring, they revive with the rest of nature, and on those occasions, a moist or dewy evening brings them forth from their retreats, for the universal purpose of continuing their kind. They chiefly live in a light rich and fertile soil, moistened by dews or accidental showers, but avoid those places where the water is apt to lie on the surface of the earth, or where the clay is too stiff for their easy progression under ground.

Helpless as they are formed, yet they seem very vigilant in avoiding those animals that chiefly make them their prey: in particular, the mole, who feeds entirely upon them beneath the surface, and who seldom ventures, from the dimness of its sight, into the open air; him they avoid, by darting up from the earth, the instant they feel the ground move; and fishermen, who are well acquainted with this,

take

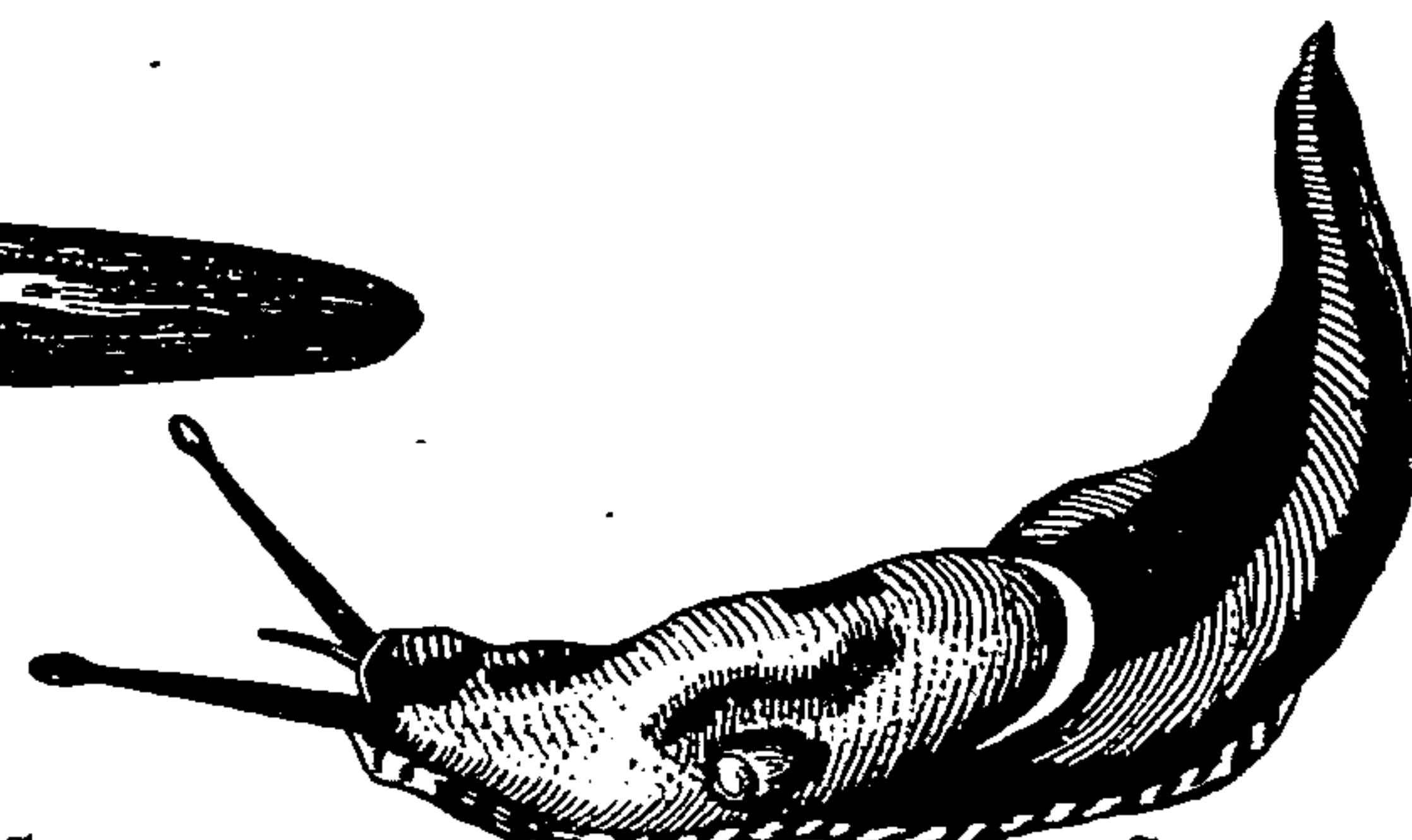
NAKED INSECTS.



THE AMBER SNAIL



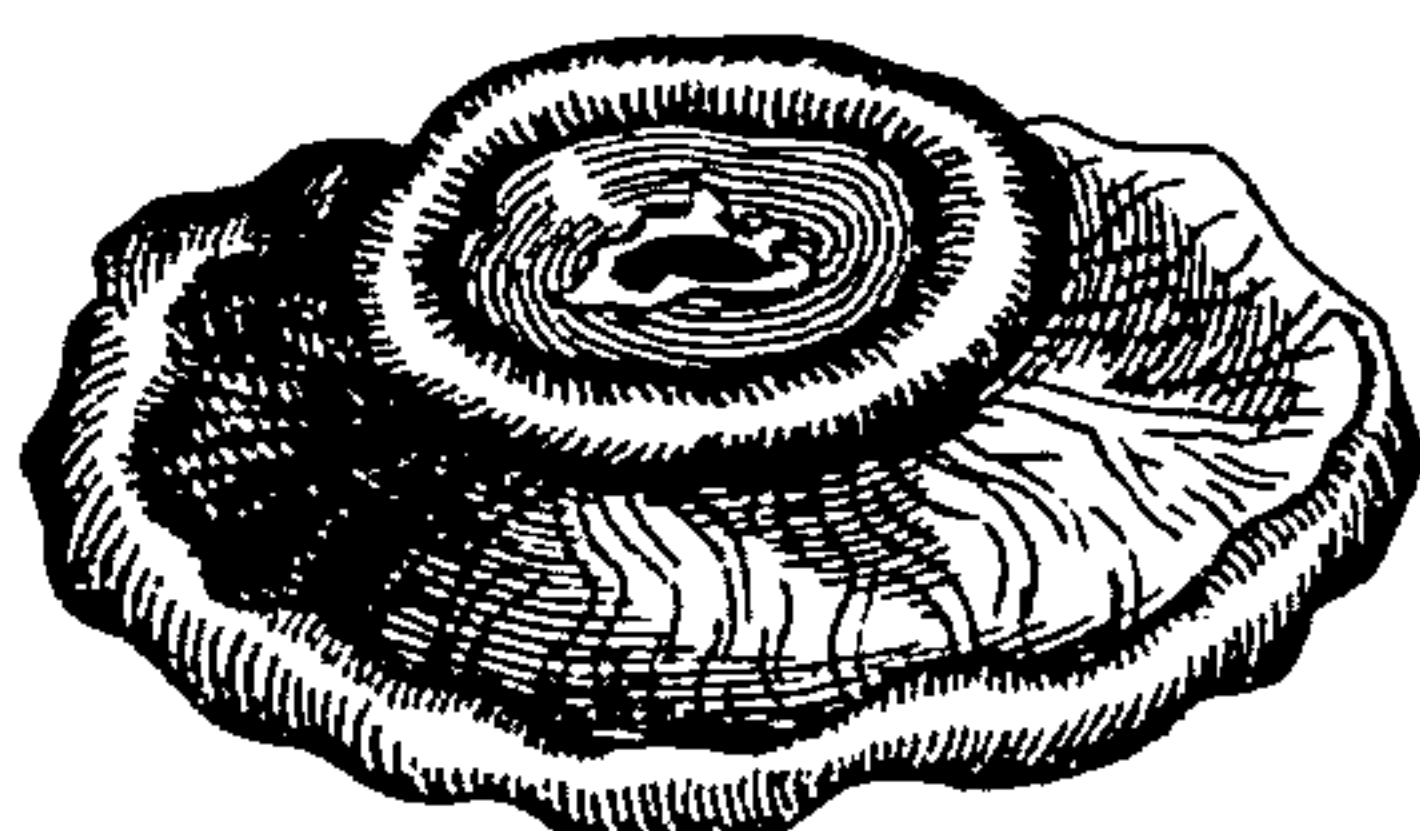
THE RED NAKED SNAIL



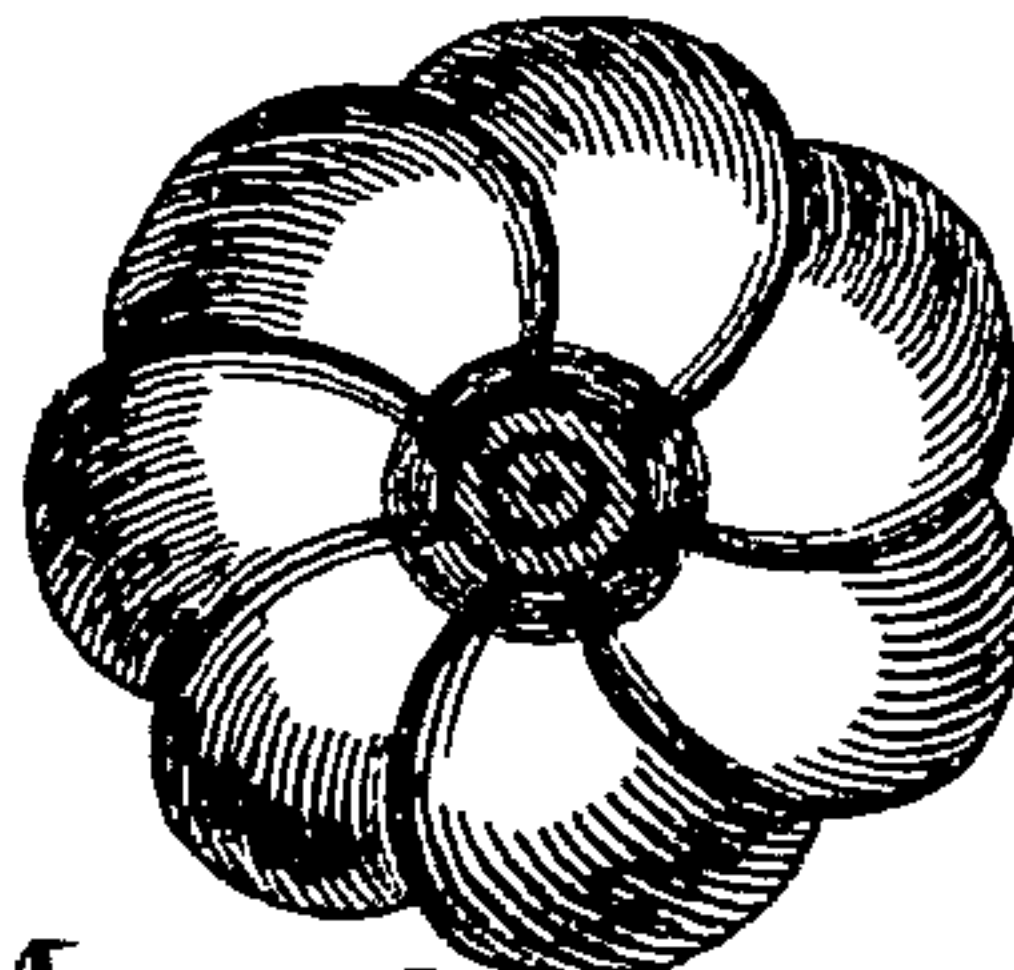
THE BLACK NAKED SNAIL



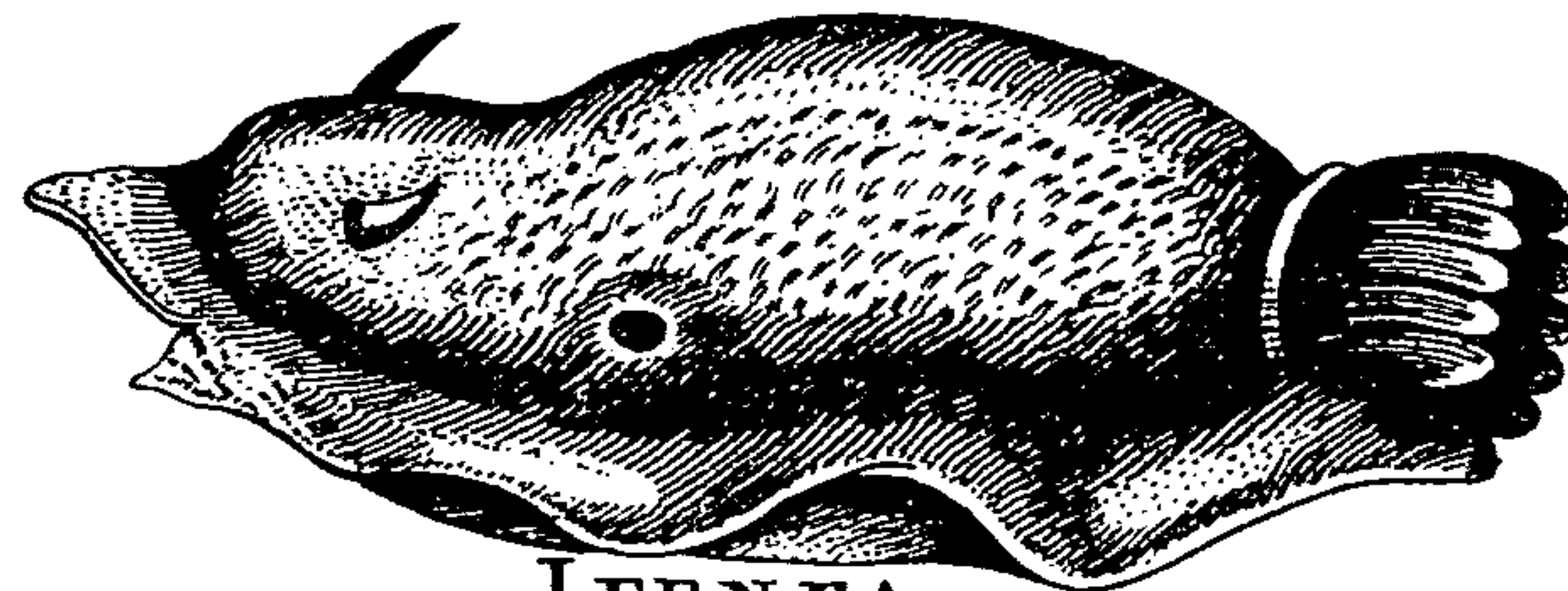
MEDUSA SP. 4



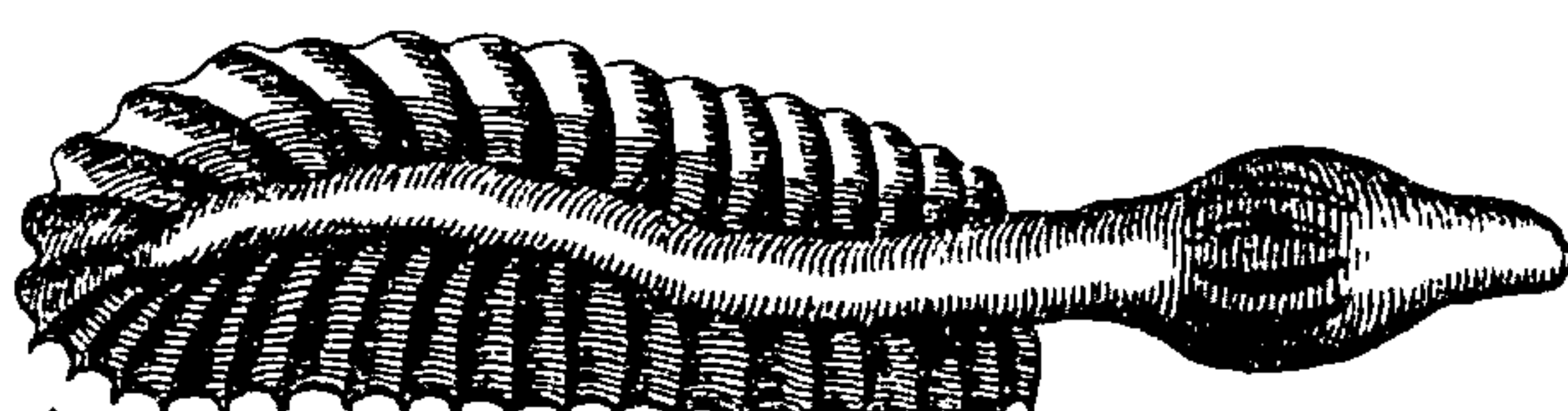
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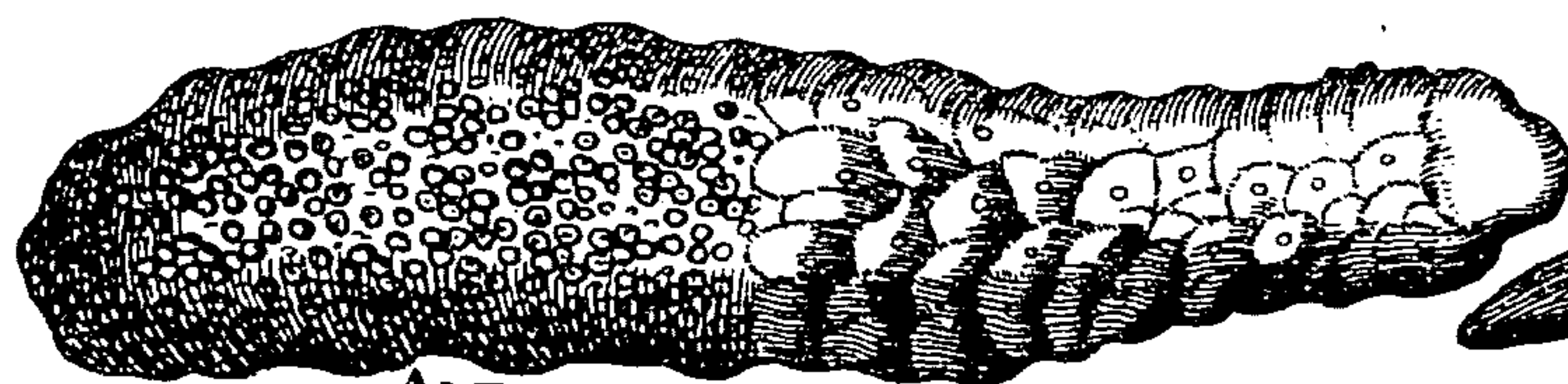
AMPHITRITE SP. 1



APHRODITA SP. 4



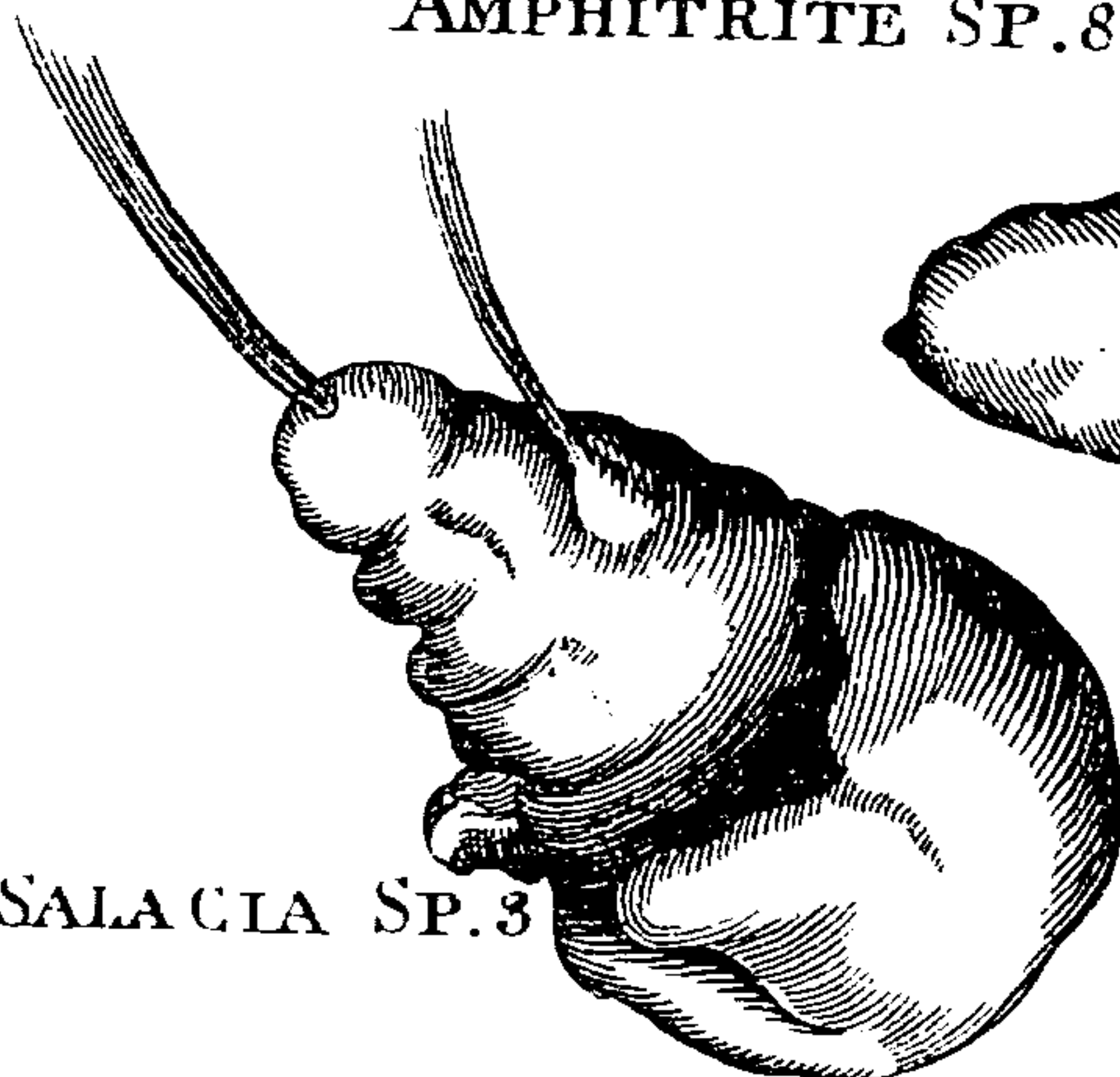
APHRODITA SP. 1



AMPHITRITE SP. 8



AMPHITRITE SP. 3



SALACIA SP. 3



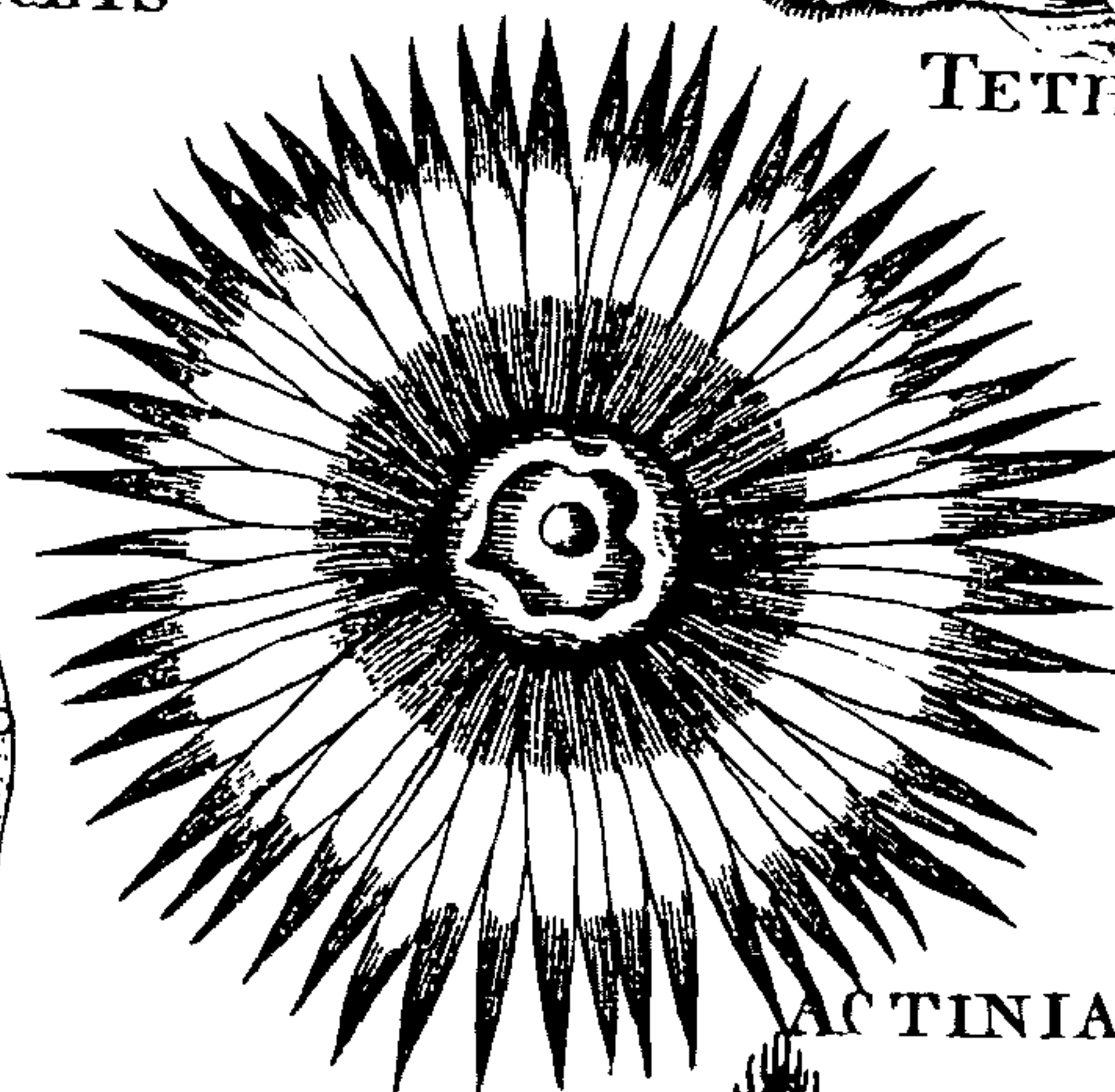
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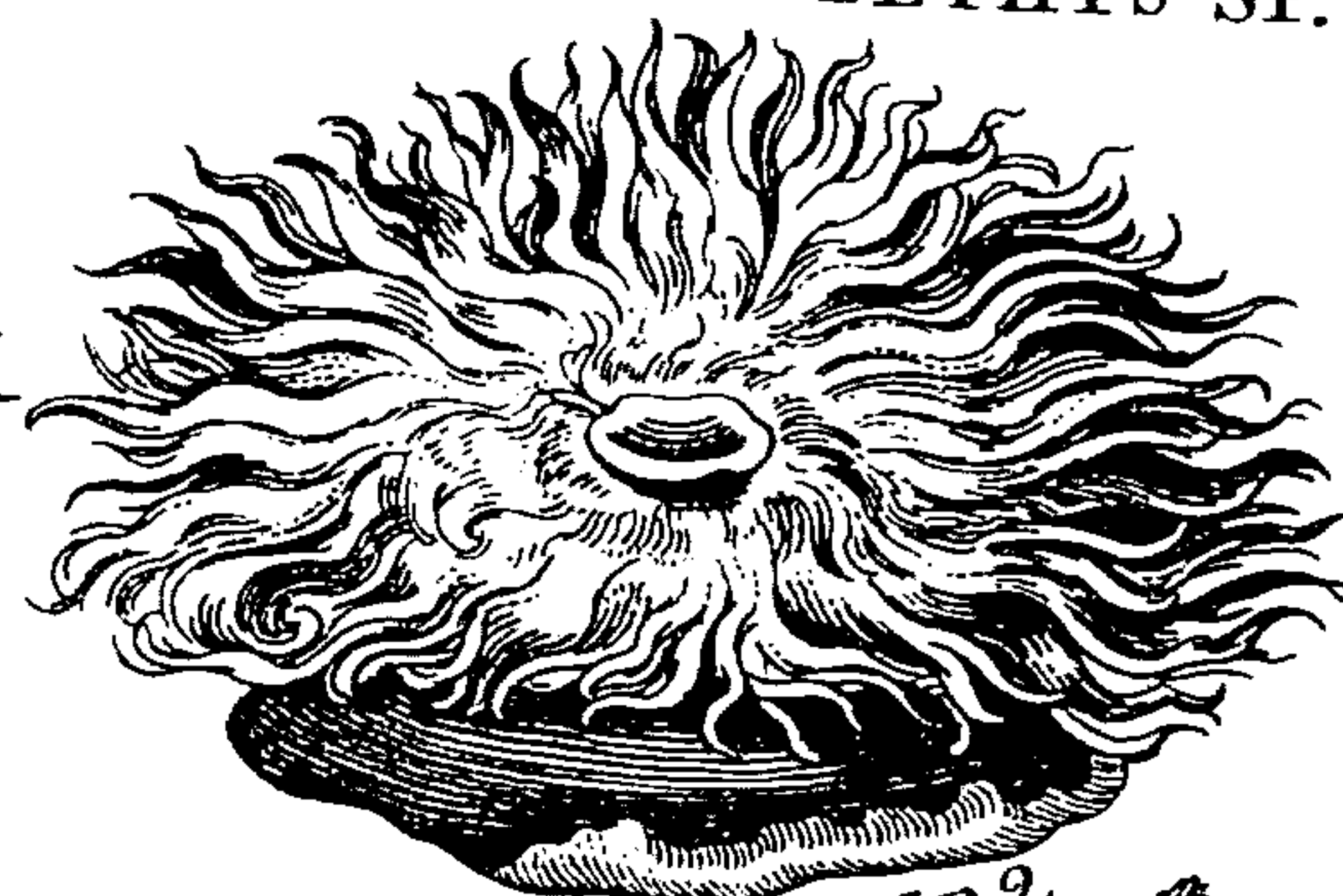
TETHYS SP. 7



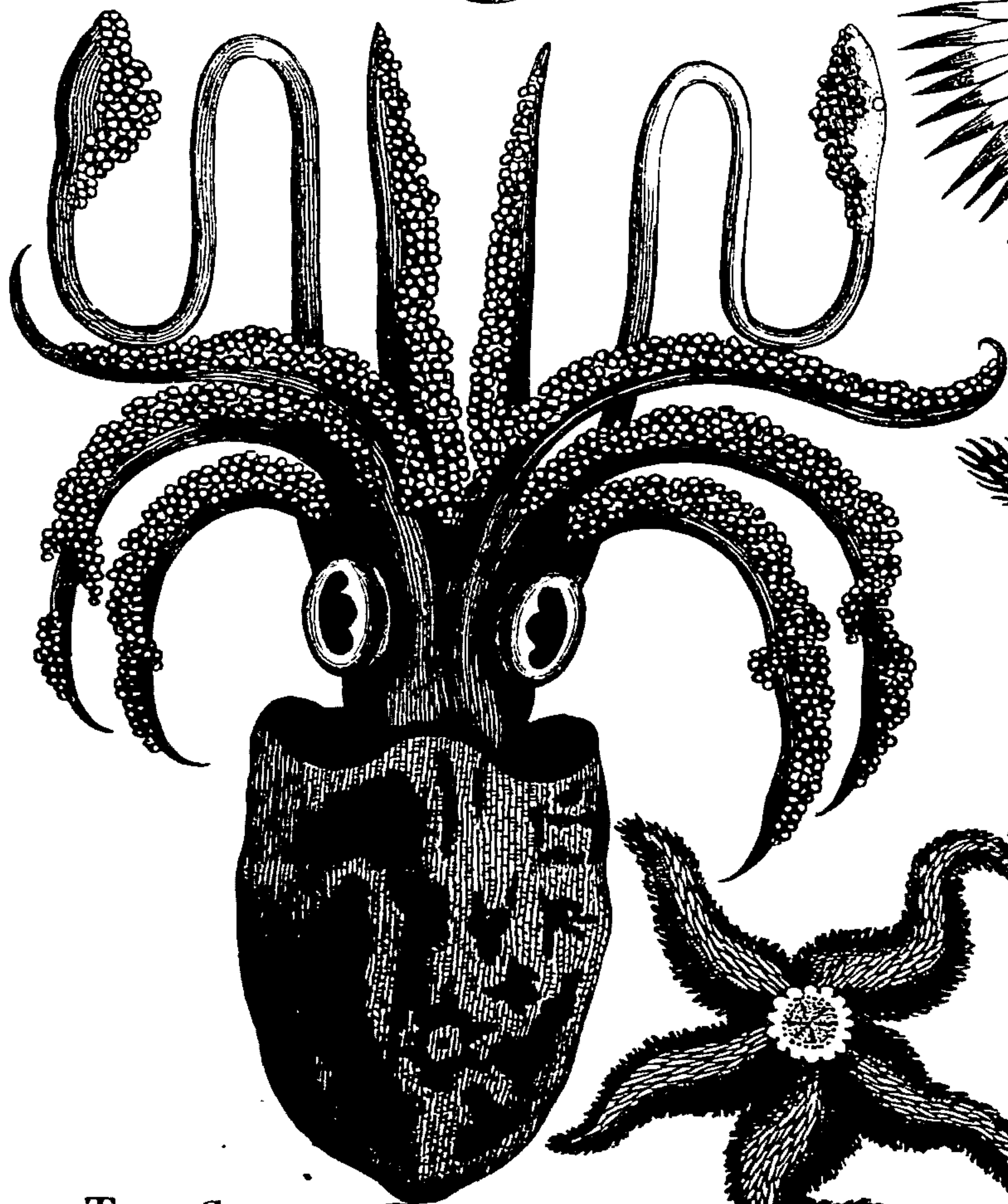
TETHYS SP. 2



ACTINIA SP. 1



ACTINIA SP. 2



THE CUTTLE FISH



ASTERIAS SP. 1



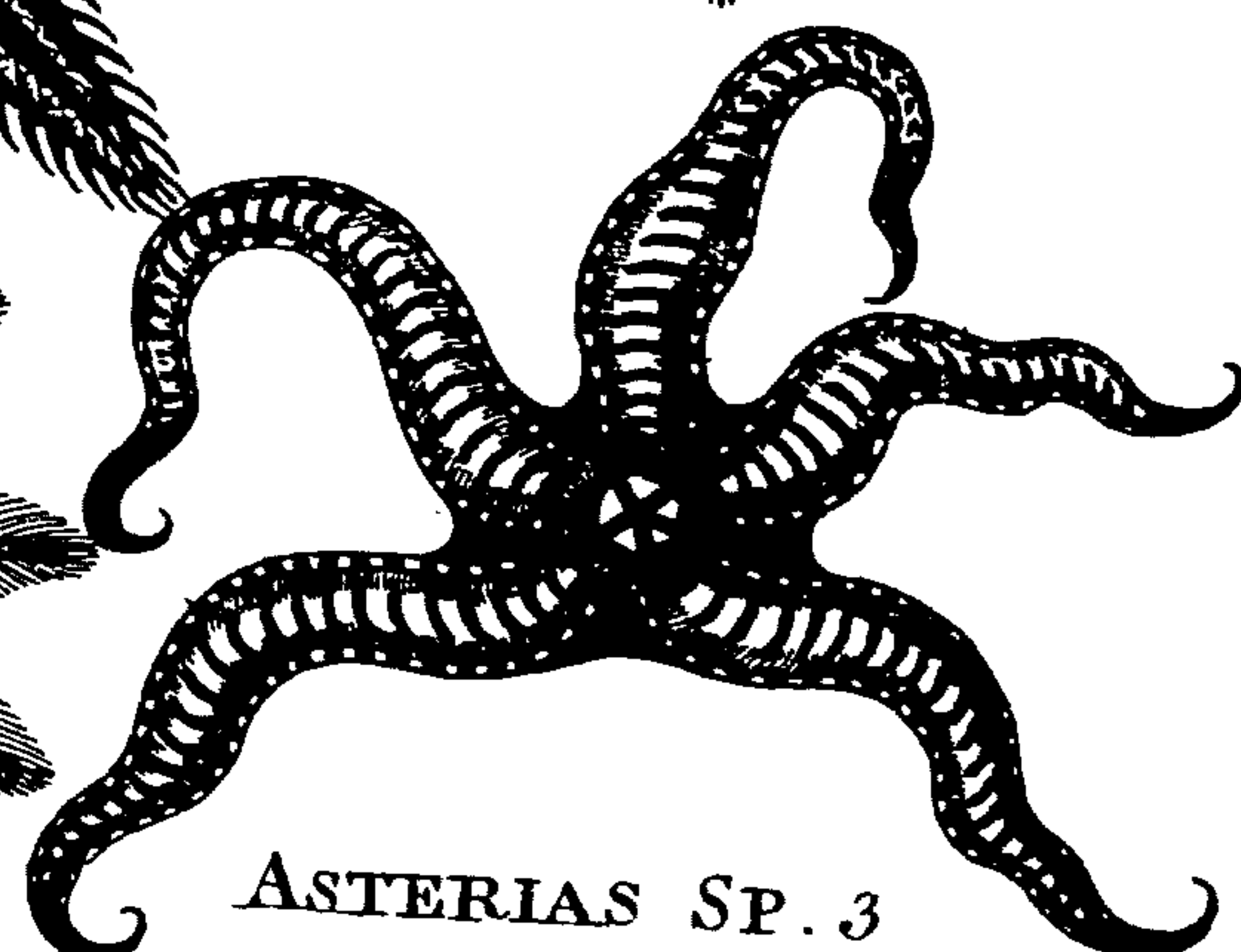
THE FIVE FINGERED STARFISH



ASTERIAS SP. 6



THE SEA COMET



ASTERIAS SP. 3

take them in what numbers they chuse, by stirring the earth where they expect to find them. They are also driven from their retreats under ground, by pouring bitter or acid water thereon, such as that water in which green walnuts have been steeped, or a lye made of pot-ashes.

Such is the general outline of the history of these reptiles, which, as it should seem, degrades them no way beneath the rank of other animals of the insect creation; we have mentioned a part of their history, which proves the imperfection of their organs, from the easiness with which these little machines may be damaged and repaired again. It is well known in mechanics, that the finest and most complicated instruments are the most easily put out of order, and the most difficultly set right; the same also obtains in the animal machine. Man, the most complicated machine of all others, whose nerves are more numerous, and powers of action more various, is most easily destroyed: he is seen to die under wounds which a quadruped or a bird could easily survive; and as we descend gradually to the lower ranks, the ruder the composition, the more difficult it is to disarrange it.

NATURAL HISTORY of the STAR-FISH, the POLYPUS, the CORAL PLANTS, and all the Varieties of the SEA-NETTLE.

NATURALISTS have given to the worm, and all these animals, the name of zoophytes. These are not produced by the ordinary forms of generation, but are propagated by dissection. Some of these, as already observed, though cut into an hundred parts, still retain life in each; and are endued with such a vivacious principle, that every part becomes a perfect animal in a very short time. They are a set of creatures placed between animals and vegetables, and form the shade that connects animal and insensible nature. Such are the Cuttle-fish, the Sea-Star, the Sea-Nettle, and Coral Plants. Numbers of what seem plants at sea, are not only the receptacles of insects, but also entirely of insect formation. Hence some philosophers have been led into opinion, that all nature was animated, and that the most inert mass of matter was endued with life and sensation, and only wanted organs to make those sensations perceptible to the beholder.

All of the Star-Fish kind are formed of a semi-transparent gelatinous substance, covered with a thin membrane, and, to an inattentive spectator, often appear like a lump of inanimate jelly, floating at random upon the surface of the sea, or thrown by chance on shore at the departure of the tide: but upon a more minute inspection, they will be found possessed of life and motion; they will be found to shoot forth their arms in every direction, in order to seize upon such insects as are near, and to devour them with great rapacity. Worms, the spawn of fish, and even muscles themselves, with their hard resisting shell, have been found in the stomachs of these voracious animals; and what is very extraordinary, though the substance of their own bodies be almost as soft as water, yet they are no way injured by swallowing these shells, which are almost of a stony hardness. They increase in size, as all other animals do. In summer, when the water of the sea is warmed by the heat of the sun, they float upon the surface, and, in the dark, they send forth a kind of shining light, resembling that of phosphorus. Some have given these animals the name of Sea-Nettles, because they burn the hands of those that touch them, as nettles are found to do. They are often seen fastened to the rocks, and to the largest sea-shells, as if to derive their nourishment from them. If they be taken and put into spirit of wine, they

will continue for many years entire, but if they be left to the influence of the air, they are, in less than twenty-four hours, melted down into limpid and offensive water.

In all of this species, none are found to possess a vent for their excrements, but the same passage by which they devour their food, serves for the ejection of their fæces. These animals take such a variety of figures, that it is impossible to describe them under one determinate shape; but, in general, their bodies resemble a truncated cone, whose base is applied to the rock to which they are found usually attached. Though generally transparent, yet they are found of different colours, some inclining to green, some to red, some to white, and some to brown. In some, their colours appear diffused over the whole surface; in some, they are often streaked, and in others, often spotted. They are possessed of a very slow progressive motion, and in fine weather, they are continually seen, stretching out and fishing for their prey. Many of them are possessed of a number of long slender filaments, in which they entangle any small animals they happen to approach, and thus draw them into their enormous stomachs, which fill the whole cavity of their bodies. The harder shells continue for some weeks indigested, but at length, they undergo a kind of maceration in the stomach, and become a part of the substance of the animal itself. The indigestible parts are returned by the same aperture by which they were swallowed, and then the Star-Fish begins to fish for more. These also may be cut in pieces, and every part will survive the operation; each becoming a perfect animal, endued with its natural rapacity. Of this tribe the number is various, and the description of each would be tedious and uninteresting; the manners and nature of all, are nearly as described.

Of all other animals, the Cuttle-fish, though in some respects superior to this tribe, possesses qualities the most extraordinary. It is about two feet long, covered with a very thin skin, and its flesh composed of a gelatinous substance, which, however, within-side, is strengthened by a strong bone, of which such great use is made by the goldsmith. It is possessed of eight arms, which it extends, and which are probably of service to it in fishing for its prey: while in life, it is capable of lengthening or contracting these at pleasure; but when dead, they contract and lose their rigidity. They feed upon small fish, which they seize with their arms; and they are bred from eggs, which are laid upon the weeds along the sea-shore.

The Cuttle-Fish is found along many of the coasts of Europe, but are not easily caught, from a contrivance with which they are furnished by nature; this is a black substance, of the colour of ink, which is contained in a bladder generally on the left side of the belly, and which is ejected in the manner of an excrement from the anus. Whenever, therefore, this fish is pursued, and when it finds a difficulty of escaping, it spirts forth a great quantity of this black liquor, by which the waters are totally darkened; and then it escapes, by lying close at the bottom. In this manner the creature finds its safety, and men find ample cause for admiration, from the great variety of stratagems with which creatures are endued for their peculiar preservation.

The Polypus lives in fresh water, and is found at the bottom of wet ditches, or attached to the under surface of the broad-leaved plants, that grow and swim on the waters. The same difference holds between these and the sea-water Polypus, as between all the productions of the sea, and of the land and the ocean. The marine vegetables and animals grow to a monstrous size. The eel, the pike, or the bream, of fresh waters, is but small; but in the sea they

grow

grow to an enormous magnitude. The herbs of the field, are at most but a few feet high; those of the sea, often shoot forth a stalk of a hundred. It is so between the Polypi of both elements. Those of the sea, are found from two feet in length, to three or four; and Pliny has even described one, the arms of which were no less than thirty feet long. Those in fresh waters, however, are comparatively minute; at their utmost size, seldom above three parts of an inch long, and when gathered up into their usual form, not above a third even of those dimensions.

It was upon these minute animals, that the power of dissection was first tried in multiplying their numbers. They had been long considered as little worthy the attention of observers, and were consigned to that neglect in which thousands of minute species of insects remain to this very day. It is true, indeed, that Reaumur observed, classed, and named them. By contemplating their motions, he was enabled distinctly to pronounce on their being of the animal, and not of the vegetable kingdom; and he called them Polypi, from their great resemblance to those larger ones that were found in the ocean. Still, however, their properties were neglected, and their history unknown.

Mr. Trembley was the person to whom we owe the first discovery of the amazing properties and powers of this little vivacious creature: he divided this class of animals into four different kinds; into those inclining to green, those of a brownish cast, those of flesh colour, those which he calls the polype de panache. The differences of structure in these, as also of colour, are observable enough; but the manner of their subsisting, of seizing their prey, and of their propagation, is pretty nearly the same in all.

Whoever has looked with care into the bottom of a wet ditch, when the water is stagnant, and the sun has been powerful, may remember to have seen many little transparent lumps of jelly, about the size of a pea, and flattened on one side; such also as have examined the under side of the broad-leaved weeds that grow on the surface of the water, must have observed them studded with a number of these little jelly-like substances, which were probably then disregarded, because their nature and history was unknown. These little substances, however, were no other than the living Polypi, gathered up into a quiescent state, and seemingly inanimate, because either undisturbed, or not excited by the calls of appetite to action. When they are seen exerting themselves, they put on a very different appearance from that when at rest: to conceive a just idea of their figure, we may suppose the finger of a glove cut off at the bottom; we may suppose also, several threads or horns planted round the edge like a fringe. The hollow of this finger will give us an idea of the stomach of the animal; the threads issuing forth from the edges, may be considered as the arms or feelers, with which it hunts for its prey. The animal, at its greatest extent, is seldom seen above an inch and a half long, but it is much shorter when it is contracted and at rest: it is furnished neither with muscles nor rings, and its manner of lengthening or contracting itself, more resembles that of the snail, than worms, or any other insect. The Polypus contracts itself more or less, in proportion as it is touched, or as the water is agitated in which they are seen. Warmth animates them, and cold benumbs them; but it requires a degree of cold approaching congelation before they are reduced to perfect inactivity; those of an inch have generally their arms double, often thrice as long as their bodies. The arms, where the animal is not disturbed, and the season not unfavourable, are thrown about in various directions, in order to seize and entangle its little prey; sometimes three or four

of the arms are thus employed, while the rest are contracted like the horns of a snail, within the animal's body. It seems capable of giving what length it pleases to these arms; it contracts and extends them at pleasure, and stretches them only in proportion to the remoteness of the object it would seize.

These animals have a progressive motion, which is performed by that power they have of lengthening and contracting themselves at pleasure; they go from one part of the bottom to another; they mount along the margin of the water, and climb up the side of aquatic plants. They are often seen to come to the surface of the water, where they suspend themselves by their lower-end. As they advance but very slowly, they employ a great deal of time in every action, and bind themselves very strongly to whatever body they chance to move upon as they proceed; their adhesion is voluntary, and is probably performed in the manner of a cupping-glass applied to the body.

All animals of this kind, have a remarkable attachment to turn towards the light, and this naturally might induce an enquirer to look for their eyes; but however carefully this search has been pursued, and however excellent the microscope with which every part was examined, yet nothing of the appearance of this organ was found over the whole body; and it is most probable, that, like several other insects which hunt their prey by their feeling, these creatures are unfurnished with advantages which would be totally useless for their support.

In the centre of the arms, as was said before, the mouth is placed, which the animal can open and shut at pleasure, and this serves at once as a passage for food, and an opening for it after digestion. The inward part of the animal's body seems to be one great stomach, which is open at both ends; but the purposes which the opening at the bottom serves, are hitherto unknown, but certainly not for excluding their excrements, for those are ejected at the aperture by which they are taken in. If the surface of the body of this little creature be examined with a microscope, it will be found studded with a number of warts, as also the arms, especially when they are contracted; and these tubercles, as we shall presently see, answer a very important purpose.

If we examine their way of living, we shall find these insects chiefly subsisting upon others, much less than themselves; particularly a kind of millepedes, that live in the water, and a very small red worm, which they seize with great avidity. In short, no insect whatsoever, less than themselves, seems to come amiss to them: their arms, as was observed before, serve them as a net would a fisherman, or perhaps, more exactly speaking, as a lime-twig does a fowler. Wherever their prey is perceived, which the animal effects by its feeling, it is sufficient to touch the object it would seize upon, and it is fastened without a power of escaping. The instant one of this insect's long arms is laid upon a millepede, the little insect sticks, without a possibility of retreating. The greater the distance at which it is touched, the greater is the ease with which the Polypus brings the prey to its mouth. If the little object be near, tho' irretrievably caught, it is not without great difficulty that it can be brought to the mouth and swallowed. When the Polypus is unsupplied with prey, it testifies its hunger by opening its mouth; the aperture, however, is so small, that it cannot be easily perceived; but when, with any of its long arms, it has seized upon its prey, it then opens the mouth distinctly enough, and this opening is always in proportion to the size of the animal which it would swallow; the lips dilate insensibly by small degrees, and adjust themselves

selves precisely to the figure of their prey. Mr. Trembley, who took a pleasure in feeding this useless brood, found that they could devour aliments of every kind, fish and flesh, as well as insects; but he owns they did not thrive so well upon beef and veal, as upon the little worms of their own providing. When he gave one of these famished reptiles any substance which was improper to serve for aliment, at first it seized the prey with avidity, but after keeping it some time entangled near the mouth, it let it drop again with distinguishing nicety.

When several Polypi happen to fall upon the same worm, they dispute their common prey with each other. Two of them are often seen seizing the same worm at different ends, and dragging it at opposite directions with great force. It often happens, that while one is swallowing its respective end, the other is also employed in the same manner, and thus they continue swallowing each his part, until their mouths meet together; they then rest, each for some time in this situation, till the worm breaks between them, and each goes off with his share; but it often happens, that a seemingly more dangerous combat ensues, when the mouths of both are thus joined upon one common prey together: the largest Polypus then gapes and swallows his antagonist; but what is very wonderful, the animal thus swallowed seems to be rather a gainer by the misfortune. After it has lain in the conqueror's body for about an hour, it issues unhurt, and often in possession of the prey which had been the original cause of contention: how happy would it be for men, if they had as little to fear from each other!

These reptiles continue eating the whole year, except when the cold approaches to congelation; and then, like most others of the insect tribe, they feel the general torpor of nature, and all their faculties are for two or three months suspended; but if they abstain at one time, they are equally voracious at another, and like snakes, ants, and other animals that are torpid in winter, the meal of one day suffices them for several months together. In general, however, they devour more largely in proportion to their size, and their growth is quick exactly as they are fed; such as are best supplied, soonest acquire their largest size, but they diminish also in their growth, with the same facility, if their food be taken away.

Such are the more obvious properties of these little animals, but the most wonderful still remain behind: Their manner of propagation, or rather multiplication, has for some years been the astonishment of all the learned of Europe. They are produced in as great a variety of manners as every species of vegetable. Some Polypi are propagated from eggs, as plants are from their seed; some are produced by buds issuing from their bodies, as plants are produced by inoculation, while all may be multiplied by cuttings, and this to a degree of minuteness, that exceeds even philosophical perseverance.

With respect to such of this kind as are hatched from the egg, little curious can be added, as it is a method of propagation so common to all the tribes of insect nature; but with regard to such as are produced like buds from their parent stem, or like cuttings from an original root, their history requires a more detailed explanation. If a Polypus be carefully observed in summer, when these animals are chiefly active, and more particularly prepared for propagation, it will be found to burgeon forth from different parts of its body, several tubercles or little knobs, which grow larger and larger every day; after two or three days inspection, what at first appeared but a small excrescence, takes the figure of a small animal, entirely resembling its parent, furnished with feelers, a mouth, and all the apparatus for seizing and

digesting its prey. This little creature every day becomes larger, like the parent, to which it continues attached; it spreads its arms, to seize upon whatever insect is proper for aliment, and devours it for its own particular benefit; thus it is possessed of two sources of nourishment, that which it receives from the parent by the tail, and that which it receives from its own industry by the mouth. The food which these animals receive, often tinctures the whole body, and upon this occasion the parent is often seen communicating a part of its own fluids to that of its progeny that grows upon it; while, on the contrary, it never receives any tincture from any substance that is caught and swallowed by its young. If the parent swallows a red worm, which gives a tincture to all its fluids, the young one partakes of the parental colour; but if the latter should seize upon the same prey, the parent Polypus is no way benefited by the capture, but all the advantage remains with the young one.

But we are not to suppose that the parent is capable of producing only one at a time, several young ones are thus seen at once, of different sizes, growing from its body, some just budding forth, others acquiring their perfect form, and others come to sufficient maturity, and just ready to drop from the original stem, to which they had been attached for several days. But what is more extraordinary still, these young ones themselves, that continue attached to their parent, are seen to burgeon, and propagate their own young ones also, each holding the same dependence upon its respective parents, and possessed of the same advantages that have been already described in the first connection. Thus we see a surprising chain of existence continued, and numbers of animals naturally produced without any union of the sexes, or other previous disposition of nature.

This seems to be the most natural way by which these insects are multiplied; their production from the egg being not so common; and though some of this kind are found with a little bladder attached to their bodies, which is supposed to be filled with eggs, which afterwards come to maturity, yet the artificial method of propagating these animals, is much more expeditious, and equally certain: it is indifferent whether one of them be cut into ten, or ten hundred parts, each becomes as perfect an animal, as that which was originally divided: but it must be observed, that the smaller the part which is thus separated from the rest, the longer it will be in coming to maturity, or in assuming its perfect form. It would be endless to recount the many experiments that have been tried upon this philosophical prodigy; the animal has been twisted and turned into all manner of shapes; it has been turned inside out; it has been cut in every division, yet still it continued to move; its parts adapted themselves again to each other, and in a short time it became as voracious and industrious as before.

Besides these kinds mentioned by Mr. Trembley, there are various others which have been lately discovered by the vigilance of succeeding observers, and some of these so strongly resemble a flowering vegetable in their forms, that they have been mistaken by many naturalists for such. Mr. Hughes, the author of the Natural History of Barbadoes, has described a species of this animal, but has mistaken its nature, and called it a sensitive flowering plant; he observed it to take refuge in the holes of rocks, and when undisturbed, to spread forth a number of ramifications, each terminated by a flowery petal, which shrunk at the approach of the hand, and withdrew into the hole from whence before it had been seen to issue. This plant, however, was no other than an animal of the Polypus kind, which is not only to be found in Barbadoes, but also on many

parts of the coast of Cornwall, and along the shores of the Continent.

NATURAL HISTORY of LITHOPHYTES and SPONGES.

IT is very probable that the animals we see, and are acquainted with, bear no manner of proportion to those that are concealed from us. Although every leaf and vegetable swarms with animals upon land, yet at sea, they are still more abundant; for the greatest part of what would seem vegetables growing there, are in fact nothing but the artificial formation of insects, palaces which they have built for their own habitation.

If we examine the bottom of the sea along some shores, and particularly at the mouths of several rivers, we shall find it has the appearance of a forest of trees under water, millions of plants growing in various directions, with their branches entangled in each other, and sometimes standing so thick as to obstruct navigation. The shores of the Persian gulph, the whole extent of the Red Sea, and the western coasts of America, are so choaked up in many places with these coralline substances, that though ships force a passage through them, boats and swimmers find it impossible to make their way. These aquatic groves are formed of different substances, and assume various appearances. The coral plants, as they are called, sometimes shoot out like trees without leaves in winter; they often spread out a broad surface like a fan, and, not uncommonly, a large bundling head, like a faggot; sometimes they are found to resemble a plant with leaves and flowers; and often the antlers of a stag, with great exactness and regularity. In other parts of the sea are seen Sponges of various magnitude, and extraordinary appearances, assuming a variety of fantastic forms, like large mushrooms, mitres, fonts, and flower-pots. To an attentive spectator, these various productions seem entirely of the vegetable kind; they seem to have their leaves and their flowers, and have been experimentally known to shoot out branches in the compass of a year. Philosophers, therefore, till of late, thought themselves pretty secure in ascribing these productions to the vegetable kingdom; and count Marfigli, who has written very laboriously and learnedly upon the subject of corals and Sponges, has not hesitated to declare his opinion, that they were plants of the aquatic kind, furnished with flowers and seed, and endued with a vegetation entirely resembling that which is found upon land. This opinion, however, some time after, began to be shaken by Rumphius and Jussieu, and at last by the ingenious Mr. Ellis, who by a more sagacious and diligent enquiry into nature, put it past doubt, that corals and Sponges were entirely the work of animals; and that, like the honey-comb, which was formed by the bee, the coral was the work of an infinite number of reptiles of the polypus kind, whose united labours were thus capable of filling whole tracts of the ocean with those embarrassing tokens of their industry.

If, in our researches after the nature of these plants, we should be induced to break off a branch of the coralline substance, and observe it carefully, we shall perceive its whole surface, which is very rugged and irregular, covered with a mucous fluid, and almost in every part studded with little jelly-like drops, which when closely examined, will be found to be no other than reptiles of the Polypus kind. These have their motions, their arms, and their appetites, but they soon expire when taken out of the sea, and our curiosity is at once stopped in its career, by the animals ceasing to give any make of their industry; recourse therefore has been had to

other expedients, in order to determine the nature of the inhabitant, as well as the habitation.

If a coralline plant be strictly observed, while still growing in the sea; and the animals upon its surface be not disturbed, either by the agitation of the waters, or the touch of the observer, the little Polypi will then be seen in infinite numbers, each issuing from its cell, and, in some kinds, the head covered with a little shell, resembling an umbrella, the arms spread abroad, in order to seize its prey, while the hinder part still remains attached to its habitation, from whence it never wholly removes. By this time it is perceived that the number of inhabitants is infinitely greater than was at first suspected; that they are all assiduously employed in the same pursuits, and that they issue from their respective cells, and retire into them at pleasure. Still, however, there are no proofs that those large branches which they inhabit, are entirely the construction of such feeble and minute animals. But chemistry will be found to lend a clue to extricate us from our doubts in this particular. Like the shells which are formed by snails, muscles and oysters, these coralline substances effervesce with acids, and may therefore well be supposed to partake of the same animal nature. But Mr. Ellis went still farther, and examined their operations, just as they were beginning. Observing an oyster-bed, which had been for some time neglected, he there perceived the first rudiments of a coralline plantation, and tufts of various kinds shooting from different parts of this favourable soil. It was upon these he tried his principal experiment. He took out the oysters, which were thus furnished with corallines, and placed them in a large wooden vessel, covering them with sea-water. In about an hour, he perceived the animals, which before had been contracted by handling, and had shewn no signs of life, expanding themselves in every direction, and appearing employed in their own natural manner. Perceiving them therefore in this state, his next aim was to preserve them thus expanded, so as to be permanent objects of curiosity. For this purpose he poured, by slow degrees, an equal quantity of boiling water into the vessel of sea-water in which they were immersed. He then separated each Polypus with pincers from its shell, and plunged each separately into small crystal vases, filled with spirit of wine mixed with water. By this means, the animal was preserved entire, without having time to contract itself, and he thus perceived a variety of kinds, almost equal to that variety of productions which these little animals are seen to form. He has been thus able to perceive and describe fifty different kinds, each of which is seen to possess its own peculiar mode of construction, and to form a coralline that none of the rest can imitate. It is true, indeed, that on every coralline substance there are a number of Polypi found, no way resembling those which are the erectors of the building; these may be called a vagabond race of reptiles, that are only intruders upon the labours of others, and that take possession of habitations, which they have neither art nor power to build for themselves. But in general, the same difference that subsists between the honey-comb and the bee, and the paper-like cells of the wasp, subsists between the different habitations of the coral-making Polypi.

With regard to the various forms of these substances, they have obtained different names from the nature of the animal that produced them, or the likeness they bear to some well-known object, such as corallines, fungimadrepores, sponges, astroites, and keratophytes. Though these differ extremely in their outward appearances, yet they are all formed in the same manner by reptiles of various kinds and nature. When examined chemically, they

they all discover the marks of animal formation; the corals, as was said, dissolve in acids, the sponges burn with an odour strongly resembling that of burnt horn. We are left somewhat at a loss with regard to the precise manner in which this multitude of cells, which at last assume the appearance of a plant or flower, are formed. If we may be led in this subject by analogy, it is most probable, that the substance of coral is produced in the same manner that the shell of the snail grows round it; these little reptiles are each possessed of a slimy matter; which covers its body, and this hardening, as in the snail, becomes an habitation exactly fitted to the body of the animal that is to reside in it; several of these habitations being joined together, form at length a considerable mass, and as most animals are productive, in proportion to their minuteness, so these multiplying in a surprising degree, at length form those extensive forests that cover the bottom of the deep.

Thus all nature seems replete with life; almost every plant on land has its surface covered with

millions of these minute creatures, of whose existence we are certain, but of whose uses we are entirely ignorant; while numbers of what seem plants at sea, are not only the receptacles of insects, but also entirely of insect formation. This might have led some late philosophers into an opinion, that all nature was animated, that every, even the most inert mass of matter, was endued with life and sensation, but wanted organs to make those sensations perceptible to the observer: those opinions, taken up at random, are difficultly maintained, and as difficultly refuted; like combatants that meet in the dark, each party may deal a thousand blows without ever reaching the adversary. Those perhaps are wiser who view nature as she offers; who without searching too deeply into the recesses in which she ultimately hides, are contented to take her as she presents herself, and storing their minds with effects rather than with causes; instead of the embarrassment of systems, about which few agree, are contented with the history of appearances, concerning which, all mankind have but one opinion.

C H A P. III.

DIRECTIONS FOR ANGLING:

CONTAINING

The whole ART of FLOAT and FLY-FISHING,
The best RULES for the CHOICE of TACKLE,
And a Description of NATURAL and ARTIFICIAL BAITs.

Collected from PRACTICE and OBSERVATION, as well as from the
WRITINGS of the most Experienced Authors on the Subject.

OF ANGLING in GENERAL.

THOUGH much has been said by many writers, concerning the antiquity of Angling, and in which they have introduced a great deal of fable, we shall content ourselves with mentioning only two authorities, such as cannot be disputed. It is certain, that angling is much more ancient than the incarnation of our Saviour; for, in the prophet *Amos*, mention is made of fish-hooks; and in the Book of *Job*, which was long before the days of *Amos*, mention is also made of fish-hooks, which must imply anglers in those times.

No diversion is perhaps better calculated to raise the mind, to calm and compose the troubled passions of the soul, to inspire health, content, and ease, than that of Angling. While the great lawyer is swallowed up in business, and the statesman is preventing or contriving plots, the angler is perhaps sitting on a bank enamelled with cowslips, listening to the enchanting voices of the little feathered songsters, while the silver stream at his feet with pleasing murmurs glides gently along. Hunting, as well as many other dangerous diversions, may have its charms to allure some people to the pursuit of it; but it cannot be so natural as that of angling: the one is all noise and tumult, the other peace and serenity. The angler leisurely surveys the wonderful works of the creation, and adores that Being, from whom he receives all his pleasures. His retirement and solitude

are physic for his soul, and delivers it from the hurry and various passions, in which other pursuits are too much involved. As exercise is its necessary companion, and a pure and clear air one of its constant attendants, health always follows in its train. In short, the various objects which continually offer themselves, as subjects for the angler's contemplation, inspire the mind with that innocent cheerfulness, ease and tranquillity, that is hardly to be expected from any other diversion, and never to be found amidst noise and tumult.

With respect to the qualifications of an angler, Mr. *Markham*, in his book entitled *Country Contentments*, says, that he should be a good scholar, and master of the liberal sciences; as a grammarian, to know how to talk or write of his art in correct language; he should have sweetness of speech, to entice others to delight in an exercise so laudable; and should have strength of argument to defend and maintain his profession against ridicule and slander: he must be bold and resolute, neither to be afraid of storms, nor affrighted at thunder. If he is not possessed of that excellent virtue, patience, and cannot endure a little fasting, he loses all the delight which contributes to make this pastime pleasing.

OF the ANGLER's RODS and LINES.

THE choice of the Angler's ROD is a matter of no small importance. For fishing at the bottom,

tom, whether with a running line or float, the reed or cane rod is, on account of its lightness and elasticity, to be preferred to the hazel, especially if you angle for those fish, which bite but tenderly, as the Roach and Dace: of these, some are put up in the form of a walking stick. There are others, which are composed of many joints, and put up all together in a bag, and are therefore called bag-rods. These last are very useful to travel with, as they take up but little room.

Next to these is the hazel rod; but that is more apt to warp than the cane. These, as well as excellent fly-rods, are to be had at every fishing-tackle shop, and therefore need no particular description. Be careful, however, when you bespeak a rod of reed or cane, that the workman does not rasp down into the bark, which grows round the joints. This is a fault, of which rod-makers are too often guilty, and thereby make the rod weaker at the joints than in any other part; for, there being no bark to repel the wet, it soon rots, by which fault you may lose a good fish, and break your rod.

It may not, however, be improper to give some directions for making rods, as many anglers live in those parts of the country, where they are not always to be bought.

When the sap is gone down into the roots of trees, which is generally between the latter end of November and Christmas, gather the straightest hazels you can find, in order to use them for stocks: these, at the larger end, must be about an inch, or more, in diameter. At the same time, gather shoots of a less size for middle pieces and tops. Tie them together in a bundle, and let them lie on a dry floor.

At the end of fifteen months match them together; and to the slender ends of the tops, after cutting off about eight or ten inches, whip a fine taper piece of whalebone of that length. Then cut the ends of the other pieces with a long slant, so that they may join exactly to each other, and spread some shoemaker's wax very thin over the slants: after this, bind them neatly with strong waxed thread. Lastly, fix a strong loop of horse-hair to the whalebone, and let the rod, so made, lie a week to settle before you use it. In this manner also you may make a fly rod; but observe, that the latter must be much more slender from the end of the stock than the former.

To make a very neat fly-rod, you must proceed in the following manner. Get a yellow whole deal board, which is free from knots; cut off about seven feet from the best end, and saw it into square breadths: let a joiner plane off the angles, and make it perfectly round, a little tapering: this will serve for the stock. Then piece it to a fine straight hazel, of about six feet long, and then a delicate piece of fine-grained yew, plained round like an arrow, and tapering, with whalebone, as before, of about two feet in length. There is no absolutely fixing the length of a fly-rod; but one of fourteen feet is as long as can well be managed. To colour the stock, dip a feather in aqua fortis, and chafe it into the deal, which will then become of a cinnamon colour.

Rods for Barbel, Carp, and other large fish, should be of hazel, and proportionably stronger than those for Roach and Dace. However, the following portable rod is so neat and useful, that no angler, who has once tried it, will be without it.

Let there be four joints, made of hickory, or some such very tough wood, and two feet four inches in length. The top must be bamboo shaved; and the stock of ash, full in the grasp, of an equal length with the other joints, and with a strong ferrel at the smaller end, made to receive the large joint, which must be well shouldered, and fitted to it with the

utmost exactness. This rod will go into a bag, and lie very well concealed in a pocket, in the lining of your coat on the left side, made on purpose to receive it.

The angler's LINE, whether it be a running-line, or for float-fishing, had best be of hair, unless you fish for Barbel, and then it must be of strong silk; but remember, that the single hair is to be preferred for Roach or Dace fishing. The fly line must be very strong; and, for the greater facility in throwing, should be eighteen or twenty hairs at the top, diminishing gradually to the hook. Lines are sold at the fishing shops, which have no joints, but are wove in one piece. But, notwithstanding this and other improvements, as some may perhaps still chuse to make their own lines, we shall endeavour to give some directions for that work.

Your hair must be round and clear, and free from galls or frers; for a well chosen, even, clear, round hair, of a kind of glass colour, will prove as strong as three that want those perfections. You will seldom find a black hair which is not round; but many white ones are flat and uneven; for which reason, if you get a lock of round, clear, glass coloured hair, you ought to make much of it.

In making your lines observe this rule: first let your hair be well washed before you set about twisting it; and then chuse not only the clearest hair for it, but such as are of an equal size; for then they generally stretch and break all together, which hairs of an unequal size never do, but break singly, and thereby deceive the angler in the strength of his line. When you have twisted your links, lay them in water for a quarter of an hour at least, and then twist them over again before you tie them into a line.

Though many prefer twisting hairs with the fingers, yet we would rather recommend a little engine for that purpose, which is sold at all the fishing tackle shops in London, with proper directions for using it.

When you use the fly, you will find it necessary to continue your line to a greater degree of fineness: in order to which, supposing your line to be ten yards in length, let your upper link consist of nine or twelve hairs, diminishing the number in the succeeding links, till you come to the size of a fine grass, and to the end of this fix your hook-link, which should be either of very fine grass, or silk-worm gut. A week's practice will enable a learner to throw out one of these lines; and he may lengthen it, by a yard at a time, at the greater end, till he can throw fifteen yards neatly; till when, he is to reckon himself but a novice.

As to the colour of your line, you must be determined by that of the river in which you fish; but we have generally found, that a line of the colour of pepper and salt (which is made by mixing a black hair among the white ones in twisting) will suit any water.

Indian or sea grass makes excellent hook-links; and, though some object to it, as being apt to grow brittle and snap in using, yet with proper management, it is the best material for the purpose yet known, especially if ordered in the following manner.

Take as many as you please of the finest you can get, put them into any vessel, and pour therein the scummed fat of a pot, wherein fresh (but by no means salt) meat has been boiled. When they have lain three or four hours, take them out one by one, and stripping the grease off with your finger and thumb, stretch each grass as long as it will yield, coil them up in rings, and lay them by. You will then find them become nearly as small, full as round, and much stronger, than the best single hairs you can get. To preserve them moist, keep them in a piece

of bladder well oiled, and, before you use them, let them soak about half an hour in water, or in your walk to the river side, put a length of it into your mouth. If your grass is coarse, it will fall heavily on the water, and scare away the fish; on which account gut has the advantage. After all, if your grass is fine and round, it is the best thing you can use.

Silk must never be mixed with hair lines; and, though silk lines are very apt to rot and break, yet they may serve in some places, where good hair is not easily to be come at. In this case a good angler will always make the lowest part of such lines of the smallest lute or viol strings.

The next thing to be considered is the FLOAT, which, for river fishing, should be of cork; but, for ponds and standing waters, quills will do very well, as also in slow rivers, when you angle near the top with tender baits or pastes. Let your cork be the finest, and free from flaws; bore it through with a small hot iron, and thrust it on to a sizeable quill, after having shaped the former with a penknife to the likeness of a pyramid, egg, or pear, of a proportionable bigness, and finely smoothed on a pumice stone. Run your line through the quill, and wedge it in with the uppermost hard part of the quill, the smaller end of the cork being towards the hook, and the bigger towards the rod. Let the cork be so poised with lead on the line, that the quill standing directly upright, the least bite or nibble may sink the cork.

A cork float, for one hair, must be no bigger than a pea; for three, as big as a bean; for six, as a small walnut; and for twelve hairs, as big as a French walnut.

Quill floats may be bought every where; and, if it chance to be bruised or split, save the plug, and it will serve another. If the water gets in at the top, cover it with sealing-wax; or if your plug be loose, take bees-wax bruised small, chalk scraped fine, and powdered black rosin, of each an equal quantity. Melt them in a spoon, and mix them well as they melt, which will be a proper cement to fasten it, by dipping the plug in, and immediately putting it into the float; for it cools as soon as sealing wax.

In chusing HOOKS, mind that they are sharp at the point, the beards not broken, of proper length, and the wire well tempered and firm: a short-shanked hook is esteemed best.

Those hooks, which are now known by the name of Kerby's hooks, for shape and temper, exceed all others. The size of your hook must be regulated by the fish for which you intend to angle. Barbel and Chub require large hooks; Carp, Eels, Tench, Perch, and Bream, a moderate sized hook; Smelts, Roach, Dace, and Gudgeons, require a small one. To sharpen a dull hook, you should carry a whetstone about two inches long, and a quarter square, that being much better than a file, which rather leaves it rough than sharp.

Of the other Sorts of TACKLE necessary in ANGLING.

THE angler who pursues his sport at any distance from home, must be supplied with many articles, such as a rod with a spare top; lines coiled up, and neatly laid in round flat boxes; spare links, single hairs, and waxed thread and silk; plummets of various sizes, floats of all kinds, and spare caps; worm bags, and a gentle-box; hooks of all sizes, and some whipped to single hairs; shot, shoemaker's wax, in a very small gallipot covered with a bit of leather; a clearing ring, a landing net, a sharp knife, and a pair of scissors. All these things, however, may be contained in a wicker panier of about twelve

inches wide, and eight high. But let us proceed to examine some of the angler's materials more particularly.

The PLUMMET, which is used in order to try the depth of the water, in which you intend to angle, should be made of sheet lead, that, by opening it, you may at anytime the more easily fix it on the hook without any fear of losing it.

The LANDING NET must be deep, with a round iron rim at top, made to fasten to the end of a long stick, in order to land such fish, as are too heavy for your tackling. At the other end of the stick should be a large hook, which you may thrust into the mouths of Salmon, and such other fish as are too bulky for your net, and by that means bring them safe to shore.

The CLEARING RING is used to disengage your hook, when it has caught hold of a weed, &c. It must be thick and heavy, but not wider than the round part of your hook, and is thus to be used. Take off the thick joints of your rod, and slip the ring over the remaining small ones, and holding a cord fastened to the ring, let it fall gently. This, as soon as it reaches the hook, will disengage it, by the assistance of your gently pulling the cord.

The GORGER is a small piece of cane, of five inches long, and a quarter of an inch wide, with a notch at each end. With this, when a fish has gorged your hook, you may, by putting it down his throat till you feel the hook, and holding the line tight while you press it down, easily disengage it.

It would be needless to give any description of the use of knives, scissors, wax, thread, &c. as these materials of themselves explain the various purposes they are intended to serve.

OF FLOAT FISHING, and of LIVE and DEAD BAITS.

WITH respect to FLOAT FISHING, there are some rules, with which the young angler ought to be acquainted. Let the rod be light and stiff, and yet so smart in the spring, as to strike at the tip of the whalebone: from fourteen to fifteen feet is a good length for the rod.

In places where you sometimes meet with Barbel, the line should be six or seven hairs at top: then diminishing gradually for two yards, let the rest be strong Indian grass, to within about half a yard of the hook, which may be whipped to a fine grass, or silk-worm gut. This line will kill a fish of six pounds weight.

For mere Roach and Dace fishing accustom yourself to a single hair, with which an artist may kill a fish of a pound and a half weight.

For your float, in slow streams, a neat round goose quill is proper; but for deep or rapid rivers, or in an eddy, the cork, shaped like a pear, is indisputably the best, which should not, in general, exceed the size of a nutmeg. Let not the quill, which you put through it, be more than half an inch above and below the cork; and this float, though some prefer a swan's quill, has great advantage over a bare quill; for the quill, being defended from the water by the cork, does not soften; and the cork enables you to lead your line so heavily, that the hook sinks almost as soon as you put it into the water; whereas, when you lead but lightly, it does not get to the bottom till it is near the end of your swim. In leading your lines, be careful to balance them so nicely, that a very small touch will sink them. Some use, for this purpose, lead shaped like a barley-corn; but there is nothing better to lead with than shot; which you must have ready cleft always with you, remembering, that when you fish fine, it is better to have on

your line a great number of small than a few large shot.

Whip the end of the quill round the plug with fine silk, well waxed, which will keep the water out of your float, and preserve it greatly.

In fishing with a float, your line should be about a foot shorter than your rod; for, if it is longer, you cannot so well command your hook when you come to disengage the fish.

Pearch and Chub are caught with a float, and also Gudgeons, and sometimes Barbel and Grayling. For Carp and Tench, which are seldom caught but in ponds, use a very small goose or duck quill float; and for ground bait, you may every now and then throw in a bit of chewed bread. For Barbel, you may bait the place, the night before you fish, with graves, which are the sediments of melted tallow, and may be had at the tallow-chandlers: use the same ground bait, while you are fishing, as for Roach and Dace. In fishing with a float for Chub, in warm weather, fish at mid-water; in cool weather, lower; and, when it is very cold, at the bottom.

Having thus given some necessary rules for float fishing, we shall proceed to a particular description of baits in general for that purpose.

The ASH GRUB is a soft, white insect, found, bent head to tail, under the bark of any decayed ash, oak, or alder, that has been some time felled. It is to be preserved in bran.

Of BEES, the black ones that breed in clay walls, at the top of the water, and the humble bees, which breed in long grass, at the bottom, are good baits for the Chub.

BOBS are of two colours, yellow and red. The former are gathered in the furrows of fresh-ploughed lands; the latter under cow dung. They are summer baits only, and must be scoured in bran, dry moss, or meal.

BRANDLINGS are worms usually found in old dung-hills, or places near them, as also in tanners bark, when thrown up in heaps after use. They must not be put in water above an hour before use, and then into fennel for immediate use. If you intend them for long keeping, put them into an earthen pot with plenty of moss, fresh shifted every three or four days in summer, and every week in winter; or, at least, the moss must be clean washed and squeezed. The point of the hook must be put in at the end of his tail, and run up to the belly, and very near the head, which must be left hanging down. Some call this worm by the name of the Gilt-tail.

CADEWS, CADIS, or CASE WORMS, are of various sorts, and in their maggot state thus house themselves: one sort in straws, called from thence Straw-Worms; others in two or more sticks, laid parallel to one another, creeping at the bottom of brooks; others, with a small bundle of pieces of rushes, duck-weed, sticks, &c. glued together, with which they float on the top, and can row themselves therein about the water, with the help of their feet: both these are called Cad-Baits.

All these animals have a wonderful faculty in gathering such bodies as are fittest for their purpose, and then glueing them together, some being heavier than water, that the animal may remain at the bottom, where its food is, (for which purpose they use stones, with sticks, rushes, &c.) and some being lighter than water, to float on the top, and gather its food from thence. These little houses look coarse, and outwardly shew no great artifice; but are well secured, and made within of a hard tough paste, into which the hinder part of the maggot is so fixed, that it can draw its shell after it any where, without danger of leaving it behind, as also to thrust out its body to reach what it wants, or to draw it into its cell, to guard it against injuries.

The PIPER is a Cadis, whose husk or case is a

piece of reed, about an inch long, and nearly as big round as a silver two-pence. These worms, being kept three or four days in a woollen bag, with sand at the bottom of it, and the bag wet once a day, will in three or four days turn yellow, when they are an excellent bait for the Chub, or indeed for any great fish, being a large bait.

There is also a smaller Cadis worm, called a COCK-SPUR, being in shape like the spur of a Cock, sharp at one end, and the case or house, in which it dwells, is made of small husks, gravel, and slime, in a most curious manner, so as not to be imitated by the art of man.

There is another Cadis, called by some a ROUGH-COAT, whose house or case is made of little pieces of rushes, straws, and water-weeds, which are so knit together with condensed slime, that they stick about the husk or case not unlike the bristles of a hedge-hog.

These three Cadis are commonly taken in the beginning of summer, and are good for any kind of float fishing. These at particular times of the year turn into flies; but to pursue this subject further, would be leading the young angler into a very difficult pursuit, highly improper upon this occasion.

DOCK-WORMS are found by plucking up the plants of that name, and washing their roots from the earth. In their fibres are little cases of a red or yellow colour, which upon being opened with a pin, will discover the worm; they are kept in bran, like the gentle.

EARTH BOBS, or GRUBS, are the brood of a beetle found in the furrows of fresh ploughed land. Gather a number of them, and put them, with a peck or two of their own earth, into a tub, and cover them from frost or cold. Thus you may keep them all winter, and kill fish with them at all times. Put them into earth and honey a day before used, and they will be an excellent bait for Bream or Carp.

GENTLES, or MAGGOTS, are easy to be got or bred by putrefaction, and scoured well with wheat bran. They are sometimes added to a worm on the hook, often to a dub-fly; but oftener by themselves, two or three on a hook. You may breed and keep them thus. Take a piece of the liver of any beast, and, with a cross stick, hang it in some corner, over a pot or barrel half full of dry clay; and as they grow big, they will fall into the barrel, where they will scour themselves, and be ready for use whenever you want them. In this manner they may be produced till after Michaelmas. If you desire to fish with them all the year, get a dead cat or kite, let it be fly blown, and when the gentles begin to stir, bury it and them in moist earth, but as free from frost as you can, and you may dig them up whenever you want to use them. They will last till March, when they will turn to flies.

LOB WORMS are found in gardens or in meadow grounds, after rain, by the help of a lanthorn at night. The best are those, which have a red head, a streak down the back, and a broad tail. They may be scoured in fennel or moss washed clean, wetted, squeezed dry, and often changed: but the best way is to take a piece of very coarse cloth, washed clean and dried, and then soaked in fresh beef liquor, in which there has been no salt; wring it, but not too dry; lay it in a broad, deep, glazed earthen pan, and your worms in it, to creep through and scour themselves in. Rinse it out in the same sort of liquor every two days, and your worms will keep a month, if set in a cool place, and be in excellent order. Put what you want for present use in wetted moss squeezed.

RED WORMS are found in rotten earth, or dung-hills, chiefly of cow or hog's dung; but the best are found among tanners bark.

WATER FROGS, which, about February or March,

March, breed in ditches, are not venomous, and are a good bait for some fish, Pike in particular. Put the hook through his mouth, and out of one of his gills. Then sew the upper part of his leg, with only one stitch, to the arming wire of your hook, and he will live a long time.

Of SNAILS, the little white one is a bait for the Roach, and the black one slit for a Chub.

WASPS, when dried in an oven, or boiled, are good baits.

PASTES are of various sorts; and, though some of them have been mentioned before, it may not be improper to bring them into one general view.

Old cheese and turpentine, and a bit of fat rusty bacon, compose an excellent bait for the Chub in winter.

Take some of the finest flour, drop a little milk or water upon it, and work it well in the palm of your hand, till almost dry. Then temper it with a small quantity of the finest honey, make it into a round ball, and keep it in a moist linen cloth, or it will grow dry and hard. If you would have it yellow, mix turmeric with it; if of a flesh colour, vermillion, and knead it well.

Take some old Cheshire cheese, the crumb of a French roll, and some sheep's kidney-suet, beat them in a mortar into a paste, adding as much clarified honey as will soften it. This is excellent for a Chub.

Take Shrimps and Prawns, pull off the shells, and skins, and beat the clear meat in a mortar, with a little honey, till it comes to a paste: with this cover the point of the hook.

Grate fine bread in a little clear water, in which gum ivy has been soaked, and you will find it a good bait for Roach and Dace.

For Carp or Tench, you may mix crumbs of bread with honey, and you will often find it answer your wish.

With respect to the use of pastes, observe these general rules. Proportion the quantity of paste you put upon your hook to the size of the fish, for which you angle. Pastes must not be angled with in rapid streams; but on small hooks, in pits, ponds, lakes, or slow running rivers.

WHEAT. A handful or two of the best wheat, boiled in a little milk till soft, and fried leisurely with honey, and a little beaten saffron dissolved in milk, is a good bait for Roach, Dace, Chub, or Grayling.

OF FLY FISHING.

FLY FISHING, or fishing at the top of the water, is of two sorts; with a natural and living fly, or with an artificial and made fly.

Of the natural flies, those mostly in use are the Green-Drake and the Stone-Fly, and these in the two months of May and June only; but there are others, of which, as well as of these, we shall give a short history at the end of this account of Fly-Fishing.

These are to be used with a short line, not more than half the length of your rod, if the wind is still; but, if you have a wind that will carry it from you, it may then be longer. This way of fishing is called Dapping, Dabbling, or Dibbling, wherein you are always to have your line flying before you up or down the river, as the wind serves, and to angle as near as you can to the bank of the same side on which you stand; though, when you see a fish rise near you, you may guide your fly over him, whether in the middle, or on the contrary side, and if you are pretty well out of sight, either by kneeling, or the interposition of a bank or bush, you will be always sure to take him, provided you are quick in your motions: your fish may otherwise remove to some other place,

if it be in the still deeps, where he is always in motion, and roving up and down for prey; but in a stream you may generally, especially if there is a large stone near, find him in the same place. Your line, in this case, ought to be of three good hairs next your hook; because in this kind of angling you are to expect the largest fish, and that, wanting length to give him line after he is struck, you must be forced to tug for it. However, not an inch of your line being suffered to touch the water in dibbling, it may be allowed to be stronger on that account.

We come now to the second way of angling at the top of the water, which is with an artificial fly. In this kind of sport, you are to angle with a line longer by a yard and a half, and sometimes two yards, than your rod; and with both this and the other, in a calm day in the streams, in a breeze that curls the water in the still deeps, you are likely to strike the best fish.

For the length of your rod, you are always to be determined by the breadth of the river in which you intend to angle. For a Trout river, one of five or six yards is long enough. If it is longer, be it ever so neatly and artificially made, it will soon become tiresome, and change your sport into toil and labour.

The length of the line, to a man that knows how to handle his rod, and cast it properly, is no manner of incumbrance, excepting in woody places, and in landing of a fish, which every one, who can afford to angle for pleasure, has somebody to do for him; and the length of line is a great advantage in fishing at a distance: to fish fine, and far off, is a principal matter in Trout angling.

Your line in this case should never be less, nor ever exceed two hairs next the hook; for one, whatever some may pretend, is not sufficient, as the least accident, even with the finest hand, may break it. However, he that cannot kill a Trout of twenty inches long with two hairs, in a river clear of wood and weeds, deserves not the name of an angler.

To have your whole line as it ought to be, two of the first lengths, nearest the hook, should be of two hairs each, the next three lengths above them of three, the next three above them of four, and so of five, six and seven, to the very top; by which means your rod and tackle will, in a manner, be taper from your very hand to your hook, your line will fall much better and straighter, and cast the fly to any certain place, to which the hand and eye shall direct it, with less weight and violence, which would otherwise circle the water, and fright away the fish.

In casting your line, do it always before you, and in such a manner, that your fly may first fall upon the water, and as little of your line with it as possible; though, if the wind be very brisk, you will then of necessity be obliged to sink part of your line to keep your fly in the water. In casting your fly you must aim at the further, or nearer bank, as the wind serves your purpose, which will be with and against you several times, on the same side, in an hour, as the river winds in its course, and you will be forced to angle up and down by turns accordingly; but you must endeavour, as much as you can, to have the wind on your back, and always be sure to stand as far off the bank as your length of line will give you leave, when you throw to the contrary side. When the wind will not permit you so to do, and that you are forced to angle on the same side on which you stand, you must then go to the very brink of the river, and cast your fly, at the utmost length of your rod and line, up or down the river as the gale serves.

Having now done with both ways of fishing at the top of the water, and the length of your rod and line for those purposes, we shall proceed to mention what materials the angler should be supplied with, in order

order to make artificial flies. As to the making them, many writers on angling have attempted to give directions for that purpose; but it is certain, if the angler is supplied with proper materials, and has the opportunity of seeing expert artists make flies, he will learn more from one week's practice and observation, than he possibly can in a twelve-month from the perusal of any book that was ever wrote on that subject.

First, you must be provided with bear's hair of different colours, as grey, dun, light, and dark-coloured, bright brown, and that which shines. Also camel's hair, dark, light, and of a colour between both. Badger's hair, or fur. Spaniel's hair from behind the ear, light and dark brown, blackish and black. Hog's down, which may be had about Christmas of butchers, or rather of those that make brawn: it should be plucked from under the throat, and other soft places of the hog. These should be either black, red, whitish, or sandy. If you want them of any other colour, you may send them to the dyer's.

Seal's fur is to be had at the trunk-maker's. This you may get dyed of the colour of calves and cows hair, in all the different shades, from the lightest to the darkest brown. You will then never need cows or calves hair, both which are harsh, and will never work kindly, nor lay handsomely.

Get also mohairs, black, blue, purple, white, and violet; camlets, both hair and worsted, blue, yellow, dun, light and dark brown, red, violet, purple, black, pink, and orange colours.

A piece of an old Turkey carpet will furnish excellent dubbing: untwist the yarn, and pick out the wool, carefully separating the different colours, and lay it by.

Get also furs of the following animals, viz. the squirrel, particularly from his tail, fox cub, from the tail where it is downy, and of an ash colour: an old fox, an old otter, a hare, from the neck, where it is of the colour of withered fern; and above all, the yellow fur of the martens, from off the gills or spots under the jaws. All these, and almost every other kind of fur, are easily got at the furriers.

Hackles are a very important article in fly making. These are the long slender feathers, which hang from the head of a cock down his neck. Fine ones may be also taken from near his tail; but be careful that they are not too rank, which they always are when the fibres are more than half an inch long. Be provided with these of the following colours, red, dun, yellowish, white, orange and perfect black; and whenever you meet, alive or dead, with a cock of the game breed, whose hackle is of a strong brown red, never fail to buy him. Observe, however, that the feathers of a cock chicken, be they ever so fine for shape and colour, are good for little; for they are too downy and weak to stand erect after they are once wet; and so are those of the bantam cock.

Feathers are absolutely necessary for the wings, and other parts of flies: get therefore feathers from the back and other parts of the wild mallard, or drake; the feathers of a partridge, especially those red ones that are in the tail; feathers from a cock pheasant's breast and tail; the wings of a blackbird, a starling, a jay, a fieldfare, and a water coot; feathers from the crown of the pewit, plover, or lapwing, and feathers from a heron's neck and wings.

Be provided with marking silk of all colours, fine, but very strong; gold and silver flatted wire or twist, a sharp knife, hooks of all sizes, hog's bristles for loops to your flies, shoemaker's wax, &c.

Remember, with all your dubbing, to mix bear's hairs, and hog's wool, which are stiff, and not apt to imbibe the water, as the fine furs, and most other kinds of dubbings do; and remember also, that martens's fur is the best yellow you can use.

The angler, who possesses these materials, and observes the manner in which skilful fly makers use them, will soon be enabled to form any fly whatever; for this art, like every other, is to be acquired only by practice. We might form an entire volume of nothing but lists of artificial flies for the use of every month in the year, which, instead of improving the young angler, would only contribute to dishearten and perplex him; we shall therefore content ourselves with mentioning only the twelve following:

1. The DUN FLY, in March: the body is made of dun wool, and the wings of the partridge's feathers.

2. Another DUN FLY, the body of which is made of black wool, and the wings of the black drake's feathers, particularly those under his tail.

3. The STONE FLY, in April, whose body is made of black wool, coloured with yellow under the wings and tail. For this fly you must use the wings of the drake.

4. The RUDDY FLY, in the beginning of May. Make his body of red wool, wrapt about with black silk. The feathers to be used are the wings of the drake, and the feathers of a red capon, which hang down on his sides next to the tail.

5. The YELLOW or GREENISH FLY, in May. Make the body of yellow wool, and the wings of the red cock's hackle or tail.

6. The BLACK FLY, in May, whose body may be made of black wool: the wings are made of those of a brown capon.

7. The YELLOW FLY, in June. His body is made of black wool, with a yellow list on each side. The wings should be formed of feathers taken from the wings of a buzzard, bound with black hemp.

8. The MOORISH FLY, whose body is made with darkish wool, and the wings of the same coloured mail of the drake.

9. The TAWNY FLY, which is good till the middle of June. The body is made of tawny wool, and the wings of the whitish mail of the wild drake.

10. The WASP FLY, in July. Make his body of black wool wrapped about with yellow silk: the wings must be made of the feathers of the drake or buzzard.

11. The SHELL FLY, which is useful in the middle of July. The body is made of greenish wool, wrapped about with the hurle of a peacock's tail, and the wings with feathers from those of a buzzard.

12. The DARK DRAKE FLY, which is good in August. The body is made with black wool, wrapped about with black silk. His wings are made with the mail of the black drake, with a black head.

Having said thus much of artificial fly-making, it may not be improper to give the young angler a short account of a few of the most material natural flies, in imitating which he may employ himself at home, when the weather will not permit him to pursue his sport abroad; and he may be assured, that, in collecting and arranging the materials, and imitating the various shapes and colours of these admirable creatures, he will soon find little less pleasure than even in catching fish.

The GREEN DRAKE FLY comes in about the middle of May; but are never properly fit for use till the end of that month, or the beginning of June, though they are sooner or later, according to the season of the year.

The STONE FLY comes much sooner, so early as the middle of April, but is not properly in season till the middle of May. He continues to kill much longer

longer than the green drake remains with us, even so long as almost to the end of June.

Both these flies, and perhaps many others, are certainly bred in the very rivers where they are taken. Our cadis, which lie under stones in the bottom of the water, turn into these two flies; and, being taken in their husk near the time of their maturity, are very easily known and distinguished, being the largest of all others.

The green drake never discloses from his husk till he is there first grown to full maturity, body, wings, and all; and then he creeps out of his cell, but with his wings so cramped and ruffled, by being pressed together in so narrow a compass, that they are for some hours totally useless to him. Hence he is compelled either to creep upon the flags, sedges, and blades of grass, if his first rising from the bottom of the water be near the banks of the river, till the air and sun stiffen and smooth them. If his first appearance above water happens to be in the middle of it, he then lies upon the surface of the water; for his feet are totally useless to him there, as he cannot, like the stone-fly, creep upon the water, until his wings have acquired the necessary stiffness. In the mean time, it is a chance, if he does not fall a prey to some trout or grayling. If he escapes these fish, his wings soon get strength, which stand on his back like those of a butterfly, and his motion in flying is the same.

The body of this fly is, in some, of a paler, in others, of a darker yellow; for they are not in all exactly of a colour. They are ribbed with rows of green, long, slender, and growing sharp towards the tail, at the end of which they have three small whisks of a very dark colour, almost black, and their tails turn up towards their back like a mallard, from whence undoubtedly they have the name of Green Drake.

With these the angler must dabble; and, having gathered a sufficient quantity of them into a draw-box, with holes in the cover to give them air, where they will continue vigorous and fresh a night or two, he may take them out thence by the wings, and bait them upon the hook in the following manner:

First take out one, (for you must fish with two of them at a time) and, putting the point of the hook into the thickest part of his body under one of his wings, run it directly through, and out at the other side, leaving him spitted cross upon the hook. Then, taking the other, put him on after the same manner; but with his head the contrary way. In this posture they will live upon the hook, and play with their wings for more than a quarter of an hour. You must take care to keep their wings dry in playing them on the water, and that your fingers are not wet when you take them out to bait them; for then your bait will be spoiled.

With respect to this fly, it remains only to acquaint the angler, that it is taken at any time of the day.

We must now be a little more particular concerning the stone-fly, which has not the patience to continue in his crust or husk till his wings are full grown; but as soon as they begin to put themselves out, he feels himself strong, squeezes himself out of his prison, and crawls to the top of some stone, where, if he can find a chink that will receive him, or can creep between two stones, the one lying hollow upon the other, he there lurks till his wings are full grown: that is your only place to find him, and from thence he undoubtedly derives his name. For want of such a convenience, he will make shift with the hollow of a bank, or any other place, where the wind cannot come at him to force him away.

His body is long, and pretty thick, and almost as broad at the tail as in the middle. His colours

are a very fine brown, ribbed with yellow, and much yellower on the belly than the back. He has also two or three whisks at the tag of his tail, and two little horns upon his head. His wings, when full grown, are double, and flat down his back, of the same colour, though rather darker than his body, and also longer. He makes but little use of his wings; for he is seldom seen flying, though often swimming and paddling in the water with the several feet he has under his belly, without stirring a wing: whereas the drake will mount steeple high into the air, though he is to be found every where high and low near the river.

The stone-fly is to be used much in the same manner as before directed for the drake; but the trout is found to take the latter more greedily than the former.

The **LITTLE YELLOW MAY FLY** is in shape exactly as the green drake; but is very little, and of as bright a yellow as can be seen.

The **CAMLET FLY** is in shape like a moth, with fine watered wings, and is an excellent bait for the grayling. This fly, though it comes in May, continues all the month of June.

The **PALMER FLY** is a caterpillar, or worm, which never continues long in one state, though their colours are very elegant and beautiful. The following is a description of one of them in their most brilliant dress. His lips and mouth are a little yellow, his eyes black as jet, his forehead purple, his feet and hinder parts green, his tail two-forked and black, the whole body stained with a kind of red spots, which run along the neck and shoulder blade, not unlike the form of a St. Andrew's cross, and a white line drawn down his back to his tail. At a fixed age, this caterpillar ceases to eat, and towards winter is covered over with a strange shell or crust, called an Aurelia, and in that manner remains in a state of total inaction during the whole winter; but in the spring following, he commences a painted butterfly. To pursue this curious insect through all its various changes, would be useless here, as it is sufficiently described in other parts of this work.

The **OAK FLY** is also known by the name of the **ASH FLY** and the **WOODCOCK FLY**. Bowkler, in his Art of Angling, says, "This fly, as I have lately been informed by a gentleman of veracity, is bred in those little balls, which grow on the boughs of large oaks, commonly called oak apples, which he accidentally discovered by opening several of these balls, which had been gathered in the winter, and brought into the house. In each of them he found a fly, some of which, being enlivened by the warmth of the room, immediately took flight, and fixed in the window, with the head downwards, the position they observe on the trees."

This fly is found on the body of an oak or ash, from the beginning of May to the end of August. It is of a brown colour, and is easily-taken.

The **ANT FLY** is often found in June, though it is in its highest perfection in July, and lasts till August and September. They must be taken from their hills, with a handful of their earth, and roots of the grass about them, and put all together in a large glass bottle. If they are not bruised in taking, nor their wings hurt, they will live above a month. If you would keep them longer, put them into a barrel, first washing it with honey and water. They are very good baits for roach, dace, or chub, fishing near the ground.

OF ROCK ANGLING, NIGHT ANGLING, &c.

ROCK-FISHING is practised chiefly in the South and South-West parts of England, and in some parts of Ireland. When you fish from rocks, your

your line must be very strong, and consist at least of five or six hairs in a link. A float is necessary, and two hooks, one to reach the bottom, and the other to keep in mid-water. The best time for this sport is, when the tide is half spent; and till within two hours of high water. Morning and evening are the most preferable times, if the tide answers. The cockle, lob, and marsh-worms are the general baits used, and a hairy worm found on the sea shore. The prizes of this fishing are only Sea Bream, Flounders, Whiting-Pollock, and Rock-Whittings.

With respect to NIGHT ANGLING, few other fish are taken at that time but Trout and Eels. In the night, the best Trout come out of their holes, when they are taken on the top of the water with a great lob or garden worm, or rather two, which you are to fish with in a place, where the water runs quietly; for in a stream the bait will not be so well discerned.

In a dead place, near a current, draw your bait over the top of the water, backwards and forwards, and, if there is a Trout in the hole, he will take it, especially if the night is dark; for then he is bold, and lies near the top of the water, watching the motion of every frog, or any thing else, that swims between him and the sky. He hunts after his prey, if he sees the water but wrinkle, or move in one of these dead holes, where the large old Trouts usually lie, near to their holds; for he is both subtle and fearful, and does not usually stir out of his hole, but lies in it as close in the day, as the timorous hare does in her form. The chief feeding of either is seldom in the day, but usually in the night, and then the large Trout feed very boldly.

You must fish for him with a strong line and a large hook, and let him have time to bite; for he does not usually forsake the hook at night, though he does frequently in the day. If the night is not dark, you must in that case fish with an artificial fly of a light colour, and at the snap; indeed, in the night, he will rise at almost any thing.

Night angling is not, however, to be recommended, as it is in some measure dangerous, and very unwholesome.

The safest method of catching fish by night, particularly Eels, is by lines left in the water from the evening till the next morning. For this purpose, your line must be fifteen or twenty yards long, according to the width of the place in which you intend to throw it. To this, at equal distances, tie five or six hempen lines, of a moderate thickness. To each of these whip a hook, and bait with a Minnow, or any small fish; but, if they are not to be had, you may make use of a large lob-worm, or even a piece of beef. If you bait with a fish, put the point of the hook in at the tail, and out at the mouth, and cover the point of the hook with a small worm. At the hook end of the cord, fasten a weight about two pounds, and throw it across the river into some still deep, or at the tail or side of a deep current, first taking care, however, to fasten the other end of the line round a tree, or to some other secure place. When you go in the morning, it will be a chance if you do not find fish ensnared on the hooks.

There are other methods of catching fish, such as bobbing, dabbling, sniggling, snapping, trolling, and fishing at hand. Of the three first, we have already made mention; we shall now proceed to describe the three last.

SNAPPING is a method of catching Pike with a rod sixteen or seventeen feet long, a stout whalebone top, as thick as the upper part of your little finger, and a strong line not quite so long as your rod. The snap-hook may be thus made. When it is to be placed at the end of your line, take twelve inches of gimp, and two large Salmon hooks, and turn them back to back. In the middle place the

gimp, and whip them together with silk well waxed: then place a Pearch hook between the other two, and fasten it towards the upper part of the shanks with waxed silk. At about eighteen inches from the bottom of your line, put on a large float of cork, and under it as much lead as will poise it. Fix your bait to the small hook, by running it under the back fin, (the best are Gudgeons, Dace, and small Roach) and let it swim down the current. When your float is drawn under water, give a strong jerk, and when you find you have hooked your fish, play him properly, and use the landing net.

TROLLING differs from snapping, in this, that the head of the bait fish must be at the bent of the hook, and that you must give the fish time to pouch or swallow the bait. Trolling hooks, which differ much from those for the snap, are to be bought ready made at the tackle shops, and therefore need no description.

ANGLING BY HAND is of three sorts, which we shall proceed to describe separately.

The first, with a line about half the length of the rod, a good weighty plumb, and three hairs next the hook, which is called a Running Line, and with one large brandling, or a dew worm of a moderate size, indeed, with almost any worm whatever; for, if a Trout is in the humour to bite, there is hardly any worm he will refuse. If you fish with two worms, you are then thus to bait your hook. First run the point of your hook in at the very head of your first worm, and so down through his body till it be past the knot, and then let it out. Slip the worm above the arming, that you may not bruise it with your finger till you have put on the other, by running the point of the hook in below the knot, and upwards through his body towards his head, till it be just covered with the head, which being done, you are then to slip the first worm down over the arming again, till the knots of both worms meet together.

The second way of angling by hand, and with a running line, is with a line something longer than the former, and with tackle made in this manner. At the extremity of your line, where the hook is always placed in all other methods of angling, you are to have a large musket bullet, into which the end of your line is to be fastened with a peg or pin even and close with the bullet. About half a foot above that, must be a branch of line, of about half a yard long for a swift stream, with a hook at the end, baited with worms; and, at about half a foot above that, another branch of line, armed and baited after the same manner, but with another sort of worm. Both these ways of angling at the bottom are most proper for a dark and muddy water, because in such a condition of the stream, a man may stand as near as he will, and neither his own shadow, or that of his tackle, will hinder his sport.

The third way of angling by hand, with a ground bait, and by much the best of all others, is with a line full as long, or a yard and a half longer than your rod, with no more than one hair next your hook, and for two or three lengths above it. There must be no more than one small pellet for your plumb, your hook little, your worms of the smaller brandlings well scoured, and only one upon your hook at a time, which is thus to be baited. The point of your hook is to be put in at the tag of his tail, and run up his body quite over all the arming, and still stripped on an inch at least upon the hair, the head and remaining part hanging downwards. With this line and hook thus baited, you are to angle in the streams, always in a clear rather than a troubled water, always up the river, throwing out your worm before you, with a light one-handed rod, like an artificial fly, where it will be taken sometimes at the top, or within a very little of the surface of the water,

water, and almost always before the light plumb can sink it to the bottom. Provided the rod is light and pliant, and true and finely made, a skilful hand will do wonders; and in a clear stream, it is undoubtedly the best method of angling for a Trout or Grayling.

Some PARTICULARS not generally known by YOUNG ANGLERS.

THERE are particular methods of making baits more agreeable to fish than what are commonly practised; and, though the use of oils, ointments, &c. are by many anglers treated with contempt, it is nevertheless certain, from repeated experiments, that the following have been known to contribute greatly to the sport, at the very time, and on the same spot, when others, who despised the use of them, could catch nothing.

Anoint a little box with two or three drops of the oil of ivy berries, made by expression or infusion. Put your worms into this box about an hour or two before you use them, and they will acquire a smell, which is irresistibly attractive, and will force any fish within the smell of them to bite.

Some have dissolved gum of ivy in oil of spike, and therewith anointed a dead bait for a Pike, when the fish has followed it with more than common eagerness. And others affirm that any bait anointed with the marrow of the thigh bone of a herne is a great temptation to any fish.

Camphire put with moss into your worm bag with your worms, makes them, if many anglers are not very much mistaken, a tempting bait.

The roe of a Salmon or Trout is said to be an excellent bait. You may preserve it, by sprinkling it with a little salt, and laying it upon wool in a pot, one layer of wool, and another of spawn.

To know at any time what bait fish are apt to take, open the belly of the first you catch, and take out his stomach very tenderly: open it with a sharp pen-knife and you will discover what he fed on.

RULES and CAUTIONS to be observed by YOUNG ANGLERS.

WHEN you have hooked a fish, never suffer him to run out with the line; but keep your rod bent, and as nearly perpendicular as you can. By this method, the top will ply to every pull he

shall make, and you will prevent the straining of your line.

For the same reason, never raise a large fish out of the water, by taking the hair to which your hook is fastened, or indeed any part of the line into your hand; but either put a landing net under him, or, for want of that, your hat. You may, indeed, in fly-fishing, lay hold of your line to draw a fish to you; but that must be done with great caution.

Your silk for whipping hooks, and other fine work, must be very small. Use it double, and wax it, and indeed any other kind of binding will do with shoemakers wax, which of all wax is the toughest and holds best. If your wax is too stiff, temper it with tallow.

Inclose the knots and joints of your lines in a small pill of wax, pressed very close, and the superfluities pinched off. This will soon harden, and prevent the knots from drawing.

If for strong fishing you use grafs, which, when you can get it fine, is to be preferred to gut, remember always to soak it about an hour in water before you use it: this will make it tough, and prevent its breaking.

When you begin fishing, wet the ends of the joints of your rods, which, as it makes them swell, will prevent their loosening.

If you happen, with rain or otherwise, to wet your rod, so that you cannot pull the joints asunder, turn the ferrel a few times round in the flame of a candle, and they will easily separate.

Before you fix the loop or bristle to your hook, in order to make a fly, to prevent its drawing, be sure to singe the end of it in the flame of a candle. Do the same by a hair, to which at any time you whip a hook.

Make flies in warm weather only; for in cold your waxed silk will not draw.

In rainy weather, or when the season for fishing is over, repair whatever damage your tackle has sustained.

Never regard what bunglers and slovens tell you; but believe that neatness in your tackle, and a nice and curious hand in all your works, especially in fly-making, are absolutely necessary.

Never fish in any water, that is not common, without leave of the owner, which is seldom denied to any but those who do not deserve it.

If at any time you happen to be overheated with walking, or other exercise, avoid small liquors, especially water, as you would poison; but rather take a glass of rum or brandy, the instantaneous effects whereof, in cooling the body, and quenching drought, are amazing.



NEW, COMPLETE, and UNIVERSAL BODY, or SYSTEM of
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B O O K V.

Containing the Natural History of **VEGETABLES,**
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WITH AN ACCOUNT OF

Their ROOTS, BARKS, WOODS, LEAVES, FLOWERS, FRUITS,
SEEDS, RESINS, GUMS, and Concreted JUICES;

A S A L S O

Their Properties, Virtues, and Uses in MEDICINE; together with the Method of
Cultivating those planted in GARDENS:

INCLUDING LIKEWISE

OBSERVATIONS on HOT-BEDS, and WATERING of PLANTS.

I N T R O D U C T I O N.

THE science of Vegetables may, with propriety, be divided into three classes: the first consists of the order of their arrangement in the botanical nomenclature; the second, of their culture; and the third of their properties. The two first, while they serve to amuse and delight us, enable us more readily to comprehend the last, which is the only one of real importance, and which claims our most serious attention.

However necessary the proper arrangement of the various species of Vegetables may appear, it is very certain, that the immense labours, which some late botanists have undergone, to give us a list of the names of plants, can contribute very little to the discovery of their properties. We should be led to suppose, from the repeated endeavours to systematise this science, that the whole of the student's pursuit was directed to acquire the names of plants. More time has been consumed in making catalogues of this nature, than, if properly applied, would have been sufficient to acquire a tolerable knowledge of the science, and perhaps have enabled the botanist to discover several new properties in the vegetable world, as yet unknown.

Numberless efforts have been made to impress distinct ideas of each plant, without fully describing

them; but every botanical system has hitherto failed in this particular, since nothing but a perfect description of each can give an adequate idea. For this reason, leaving such systems to the speculative, we shall, in the following work, pursue the common method, and give a perfect account of every Vegetable in use, its roots, leaves, stalk, height, flower, and seeds. Such complete distinctions are absolutely necessary to distinguish one object from another, throughout every department of Natural History, but particularly in this, where the objects are so numerous. The deviations of Nature are not to be reduced into systems: almost every plant, even of the same species, has its variations, this year differing, in some respects, from what it was the last.

Let us then, without paying any regard to systematical arrangement, treat this subject in the manner of the ancients, such as Pliny and Aristotle. Those, that have been already useful to mankind, we shall take particular care minutely to describe, and leave posterity and chance to find out the uses of others now unnoticed. But, before we proceed in this undertaking, it may not be improper to take a survey of Vegetables in general.

In every vegetable production, we may consider either the seed, the root, the leaf, the bark, the stalk, the

the pith, and the flower: all which are necessary in carrying on the business of vegetation, and transmitting the species, from season to season, without interruption. Though the principles of vegetation reside in every part of the plant, yet we generally find greater proportions of oil in the more elaborate and exalted parts of Vegetables, that is, in the seed. As this contains the rudiments of the future Vegetables, it was necessary that it should be well stored with principles, that would preserve the seed from putrefaction, and tend to promote vegetation. When the seed is sown, in a few days, it imbibes so much moisture as to swell, and thus it produces the radicle, or incipient root, with some force, which, when shot into the ground, imbibes nourishment from thence, and what it receives becomes, in a short time, the chief supply of future growth. When the root is thus far grown, it supplies the plume with nourishment, till this, by expanding and growing thinner, turns to green leaves, which are of such importance to the incipient plant, that it perishes, and will not thrive, if they are pulled off; but when the plant is so far come to maturity, as to have branches and expanded leaves to draw up nourishment, the seminal leaves, being no longer useful, soon perish, their perspiration being immediately impeded by the newly produced leaves that overshadow them, and their sap being drawn away by the larger channels of the upper foliage.

As the plant advances in stature, the first, second, third, and fourth order of lateral branches shoot out, each lower order being larger than those immediately above them, not only on account of their having a longer time to grow, but because, being inserted in larger parts of the trunk, and nearer the root, which is the grand supply, they are provided with greater plenty of sap: hence we frequently see trees beautifully tapering to the top.

As soon as the circulation of the blood in animals was discovered, botanists began to think, from the analogy there was between all the works of Nature, that the same circulation must also prevail in Vegetables; and some have actually undertaken to prove, that the sap first rises to the tops of trees by means of the pith, and then descends to the root by the bark, with the swiftest motion. That great naturalist, Dr. Hales, undertook by experiments, to confute this opinion; but, without entering into a detail of that gentleman's opinion, or that of Mr. Du Hamel, thus far we may venture to conclude, as a certain fact, that there is a constant flow of juices through every plant, the root furnishing it with great quantities, while the leaves, spreading an extended surface to the sun, have their moisture attracted in very large quantities; and, when the influence of his beams no longer continue, they at night act as sponges, and imbibe the humidity of the air. Thus we see, that the leaves are absolutely necessary in the works of vegetation: they, like young animals, are furnished with instruments to suck it from thence, and, besides this, they separate and carry off the redundant watery fluid, which, by being long detained, would turn rancid, and become fatal to the plant.

As the leaves are found to exhale moisture, so they are known to imbibe nourishment from the air. The acid and sulphureous spirit, with which the air abounds, is thence extracted by the leaves of plants: so that it is probable, the most exalted and aromatic principles of Vegetables are derived from this source, rather than from the grosser watery fluid of the sap. Leaves are found to perform, in some measure, the same office for the support of vegetable life, that the lungs of animals do for the support of animal life; but, as plants have not the power of contracting or dilating the chest, their inspirations will depend wholly on the alternate changes of the air. The

vine is known, from repeated experiments, to draw but little watery nutriment from the earth by its roots, and therefore it imbibes greater quantities of dew, impregnated with air by night, from whence it derives its richness of flavour. It is probable, that this may be the reason, why plants in hot countries abound more with fine aromatic principles, than northern Vegetables: the former chiefly extract their juices from the air by the leaf, the latter theirs from the earth by the root.

Nothing can exceed the regularity, with which leaves are placed on every plant; but the care which Nature seems to take of the young shoots when budding, still deserves greater admiration; for the most tender shoots are ever nourished by those, which have acquired a greater degree of strength. Besides this, the leaf, as every one knows, has two different surfaces: the upper, which seems more smooth and polished; the lower, in which the ribs are more prominent, and of the colour of a paler green. The cause of this difference has not a little puzzled the botanists of every age: perhaps, the upper polished surface, from its position, being more exposed to the external injuries of the air and rain, is thus formed rather to defend the lower part, in which, probably, the attractive powers may reside. In this manner, the leaves of trees contribute to improve the flavour of the fruits, and regulate the vegetation.

The assiduity of Nature, in the production of growing plants, is not greater than her care to preserve the seeds, which are to propagate the future Vegetables. The curious expansion of blossoms and flowers seem to be appointed by Nature, not only to protect, but also to convey nourishment to the embryo seed, and the fruits in general serve to supply the seeds with moisture.

When trees stand thick together in woods or groves, the lower branches, being shaded by those of the neighbouring trees, can perspire little, and imbibe less, on which account they perish; but the top branches, being exposed to a free air, perspire plentifully, and by this means drawing the sap to the top, advance in height rather than extent. Dr. Hales compares a tree to a complicated engine, which has as many different powers of attraction, as it has arms or branches, each drawing from their common fountain of life, the root. The younger the plant, the greater is its power of attraction; but, as it grows older, the vessels of circulation become more rigid, it ceases to push out its tender branches, and the whole plant, from the rigidity of age, acquires its greatest degree of hardness, when it ceases to vegetate.

Though fruits in general are the most inconsiderate agents in promoting the work of vegetation, being, as is commonly supposed, only destined to supply the seed with proper moisture and nourishment; yet, with respect to man, they make the most useful and pleasing part of vegetable productions. Their general properties, as constituting a part of our food, may be considered as arising from their different degrees of maturity. In general, while unripe, they may be considered as astringent, and in some measure partaking of the qualities of the bark of their respective trees: when come to a sufficient degree of maturity, they cool and attenuate; but, from too great a power in these respects, they often bring on disorders that are fatal in warm climates, where their juices are possessed of those qualities much more than with us. In our climates, however, this seldom happens, and they probably do not make a sufficient part of our diet.

As to the increase of plants, some proceed from seeds only, others from seeds and suckers; as tulips, for instance, which have seeds in their piffils, and a large quantity of small suckers, which rise, in a numerous progeny, round the parent plant. Some

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are propagated and brought to perfection by grafts, which are no more than small branches of the finest sort artfully inserted in an aperture, made in the wood or bark of some wild or ordinary plant; while others are multiplied by slips. The strawberry plant throws out two long fibres on each side, the knots whereof take root in the earth, and become so many new stems. The branch of a vine bowed down, and thrust into the earth, shoots out fibres through the knots that lie buried and concealed; cut the branch off where it joins with the stock, and the other end, which rises out of the ground, becomes a new vine. In short, there are plants, which proceed from little slips or twigs of trees, when set in the ground, without any other manual operation.

There is no difficulty in accounting for the two first; because a seed, or a seed and a sucker, contain in them a shoot, or a minute plant complete. The graft, likewise, containing its buds for leaves, as well as fruits, the sap, when it flows into it, not only gives, but discovers what the graft contains. Let us now proceed to what at first sight seems more difficult to be accounted for, the increase from slips of trees. When we set a slip into the ground, the sap, which overflows it, puts some of those shoots in motion, which are to produce new branches. The little suckers, which expand themselves on each side, are, by the pressure of the earth upon them, prevented from rising with ease into the air. The juice, which ascends into the stem, coming afterwards to flow back, and descend upon the same suckers in the earth, take their course downwards instead of upwards, and become roots instead of branches. From whence we may conclude, that the stem gives only a passage to the sap and the air, and that the sap and air give nutriment and motion to all the shoots; that these shoots are produced before-hand, and are perhaps wrapped up in one another, as they were from the beginning of the world, for the benefit and advantage of mankind, through the succession of all ages.

We must not quit our considerations on Vegetables, without paying particular respect to flowers, which are formed to please us, and for our delight have received their amiable appearances: no eye but ours can enjoy their beauties: common animals never seem to be affected with pleasure when they behold them, nor do they ever stop to contemplate their wonders. They confound them with the common herbage of the field, they trample on the most beautiful of the tribe, and are perfectly insensible of this ornament of the earth. Whereas man, amidst a crowd of objects and riches that surround him, distinguishes and pursues the flowers with a peculiar complaisance.

Flowers have likewise an agreeable correspondence with our eyes, and a set of powerful attractions that invite us to approach them. Whenever we gather them, they present us with new perfections, in proportion to our regarding them with nearer attention. The greatest part of them not only regale our view with the beauty and arrangement of their colours, but gently delight our smell with an exquisite perfume; and, when they have gratified our senses with an innocent satisfaction, the mind still discloses wonders in them, which ravish its faculties.

When we carefully survey the structure of a flower, in order to discover its relation with the seed, we always find one or more inclosures appointed for the reception of the semen. Around that inclosure is a set of chives sustaining several packets of powder, which they scatter on all parts. The whole is encompassed with an empalement, or soft robe, that unfolds and closes, with a kind of precaution, according to the disposition of the air.

All these things convince us, that these parts, which are disposed with so much art and regularity, and wither round the inclosure, when the seed is formed, are instrumental in the generation of that seed.

It is difficult to conceive, how far the design, to delight man with the beauty and profusion of flowers, has been extended. Their multitude is a real prodigy, and we are led to imagine, that they had been commanded to spring beneath every step we take. They rear their heads on the lofty tops of trees, and are diffused through the herbage that creeps along the earth; they embellish the valleys and the mountains, and the meadows are enamelled with their colours; they are gathered from the skirts of woods, make their appearance even in deserts, and the earth is a garden entirely covered with their bloom. The prospect they afford us is so pleasing, that the generality of those arts, which are ambitious to please, seem most successful when they borrow the assistance of flowers: sculpture imitates them in its softest ornaments, architecture courts the embellishments of leaves and festoons on those columns and fronts, which would otherwise be too naked: the richest embroideries are little more than foliage and flowers; the most magnificent silks are almost covered with these charming forms, and are thought beautiful in proportion as they resemble the lively tinge of natural flowers.

Flowers are not only intended to beautify the earth with their shining colours, but the greatest part of them, in order to render the entertainment more exquisite, diffuse a fragrance that perfumes all the air around us; and it should seem as if they were solicitous to reserve their odours for the morn and evening, when walking is most agreeable; but their sweets are very faint during the heat of the day, when we visit them the least. Let us endeavour to account for this.

The sap is perpetually transpiring through the flowers, in proportion to the sun's warmth. These fine spirits, which are the essence and aromatic parts of the flowers, are easily dispersed through an air rarified by heat, and affect the smell but faintly at that time; but their dissipation is much abated, when the air is condensed by the return of night. The action of the sun, by which they are diffused, is too weak, in the morning and evening, to scatter them to any considerable distance, and it is then that the reunion of these spirits affect us with the strongest impressions. The evaporation of these minute particles forms an atmosphere around the flower, which is dissipated or condensed, as the action of the sun is more or less intense.

This is a demonstration, that the spirit of flowers are dispersed in proportion to the sun's action upon them; but we will not confine ourselves to this particular: in the study of natural things, true philosophy is never limited to the contemplation of their mechanism, but extends its curiosity to the benefits they produce. We are easily sensible of the intercourse that appears between the flowers, the air, and the sun beams; and can we possibly be unacquainted with that goodness, which is so attentive to make this correspondence advantageous to man? Providence has not only enamelled his way with flowers, for the entertainment of his view, but has taken care to embalm and purify the air he breathes, by shedding the noblest perfumes in his passage.

Their services, however, are not limited to the sight and smell, for other senses may derive advantages from them. They supply us with pastes to enrich our deserts, and present us with powders to perfume our wardrobes; they afford us delicate syrups, and even remedies to relieve us, when we are indisposed; violets, jonquils, and peach-blossoms, roses,

roses, jessamines, carnations, and especially orange-flowers, accommodate us with conserves, and a variety of confections, together with essences and distilled waters, that continue to us the enjoyment of the odours, and other useful qualities of flowers, when they have long ceased to be in season.

Upon the whole, we may undoubtedly draw this conclusion, that every Vegetable and flower, how-

ever lightly and insignificantly custom and taste may have taught us to behold it, affords us an ample field of admiration, and cannot fail to inspire us with the highest esteem and veneration for the great Author of Nature, who has created and formed so many things for our use and amusement.

CHAPTER I.

Containing the NATURAL HISTORY of FOREIGN VEGETABLES, and their ROOTS, BARKS, WOODS, LEAVES, FLOWERS, FRUITS, SEEDS, RESINS, GUMS, and CONCRETED JUICES.

NATURAL HISTORY of ROOTS.

THE CALAMUS AROMATICUS or *Acorus Verus*, is a sweet smelling flag. It has a long, oblique, knotty root, about as thick as a man's finger, and a little compressed; when fresh, it is of a whitish green colour; but afterwards turns of a reddish yellow. It is white and spongy within, has a sharp bitterish aromatic taste, with a distant relish of that of garlick, and a fragrant aromatic smell.

From the root that lies near the surface of the earth, there arise leaves, some of which are a cubit in length, others half as much, and its peculiar characteristic is a simple elegant iulus, with leaves like the aromatic flower de luce. They are sharp at the point, of a pleasant green, smooth, and above a quarter of an inch broad. They have six petals, which are blunt, hollow, loose, thick above, and truncated below. There are six thickish filaments, a little longer than the corolla. The antheræ are thickish, and join to the dedymæ. The germen is gibbous, longish, and there is no style; but the stigma is a prominent point. The capsula is short, triangular, and consists of three cells. The seeds are of an oblong oval.

The INDIAN ACORUS, by some called the true *Asian Calamus Aromaticus*, has a root not unlike the former, but more tender and of a pleasanter smell; the taste is bitterish, but not disagreeable. It is found both in the East and West Indies, and is in shape much like the former. It is recommended for inciding cold gross humours, and some pretend it is good against poisons.

ANGELICA is placed by Ray among the umbelliferous herbs with a shorter seed. The flower, according to Linnæus, is a large convex umbella, and the universal corolla is uniform; but the proper consist of five oval concave petals, that are nearly equal to each other. There are five simple filaments, and roundish antheræ. The germen is beneath the receptacle; there are two simple erect styles of the length of the corolla, and the stigmata are capitated. The fruit is oval, oblong, streaked, and may be separated into two parts. There are two oval, oblong seeds, convex and streaked on the one side, and the other plain. The root is three digits thick, with many fibres, black and wrinkled on the outside, but within, white, soft, juicy, sharpish and bitterish. The stalk grows to two cubits and upwards in height, and is hollow, full of branches, with large leaves like those of meadow smallage, but much sharper. The dried root is brought to us from Bohemia, the Alps, and the Pyrenees. The best is thick, of a dusky colour without, whitish within, and with a most fragrant smell, a little in-

clining to musk, and of an acrid aromatic taste. The roots brought from Spain, are now very seldom prescribed upon any occasion. Our own candied Angelica roots are well known to every one as a sweetmeat.

ANTHORA, in English, *Monk's-hood*, or *wholesome Wolf's Bane*, is the *Aconitum* of Tournefort. The flower has five unequal petals set opposite to each other in pairs, the uppermost of which is galeated with its back turned upward, the point sharp, and reflected towards the base. The two on the sides are broad, roundish, and connivent; but the lowermost two are oblong, and turned downwards. The colour is of a palish yellow, and the pistil turns to a fruit, in which are collected, as into a head, corniculated membranaceous sheaths, full of angular wrinkled blackish seeds. The plant is generally about nine inches high, and sometimes it is above a cubit, with a singular stiff angular hairy stalk, on which the leaves are set alternately, are whitish below, and have a bitterish taste. The virtues of this plant are uncertain, and some think the use of it is dangerous.

ARISTOLOCHIA is of several kinds, as the round, the long, the clematitis, and the slender. *Aristolochia Rotunda*, or *Round Birthwort*, according to Linnæus, has a single unequal petal, with a ventricose base, and consists of an oblong tube of a hexagon cylindrick shape, and a broad edge, extended downwards like a long tongue. There are six antheræ joined to the lower part of the stigmata, and the germen is oblong, angular, and under the receptacle. There is scarce any style, and the stigma is roundish, concave, and divided into six parts. The capsula is large, hexangular, and consisting of six cells. There are many flat seeds, and the fruit is round. It consists of a great number of stalks proceeding from a single root, which are a cubit high, and the leaves are placed alternately on the stalks, almost without any pedicle. They are roundish, of a dusky green colour, and, as it were, embrace the stalks. The flowers proceed from the wings, the root is tuberosa, solid, three inches thick, roundish, wrinkled, with a few fibres dusky on the outside, of a palish yellow within, and covered with a thick bark: the taste is acrid, aromatic, and bitterish.

ARISTOLOCHIA LONGA, *Long Birthwort*, has the same sort of flower as the former, only it is of a whitish green colour within, and outwardly of an herbaceous colour. The fruit is terminated like a top, and when it is ripe it gapes, shewing a broad reddish seed, which at length turns to a dusky colour. The root is oblong, and about an inch thick, though sometimes it grows to the thickness of a man's arm; it is wrinkled, and of a dusky colour without,

without, but within it is yellowish, and the taste is somewhat more faint than the former.

ARISTOLOCHIA CLEMATITIS has a long creeping root, divided into several fibres; it is seldom thicker than a goose quill, is dusky without, and yellowish within; and has a bitter taste, with a smell stronger than the former. The stalks are a cubit in length, and are rounder, harder, and stronger than those of the former; likewise the leaves are larger, full of veins, and of a pale green colour, with longer pedicles than the rest. The flowers are pale, shaped like those of *round Birthwort*, but less, and the fruit is like that of *long Birthwort*, but bigger, they being of the size of small apples; likewise the seeds are larger.

ARISTOLOCHIA TENUIS, *slender Birthwort*, otherwise called *Pistilochia*, has a root which consists of long slender filaments, meeting in one head of a yellowish colour, with an aromatic smell, and an acrid bitter taste. The stalks are about nine inches high, and slender. They are angular and streaked, and full of branches, with the leaves more pointed than the *round Birthwort*, but less wrinkled, and a little sinuous on the edges. The flowers are like those of the *round Birthwort*, but less, and sometimes black; but at others they are of an herbaceous yellowish colour, with fruit like those of the round. When they are ripe, they gape at the part next the pedicle, and the seeds are like those of the *round Birthwort*.

All the kinds are reckoned to be opening and a little cleansing, and some esteem the round sort as best. They are said to be good against catarrhs and disorders of the breast from gross humours; as also against wind, pains of the cholic, and obstructions of the viscera.

BEHEN ALBUM, *white Behen*, is a root which is brought to us in pieces about as thick as a man's finger; of an ash colour without, with a contracted wrinkled surface, but pale and pulpy within, and of an acrid taste.

BEHEN RUBRUM, *red Behen*, is a root brought to us in pieces like jalap, and is dry, thick, and of a blackish red colour, with a taste and smell like the former, but more faintish. They are both brought from Syria and other places. It has a long geniculated root without hairy fibres, and is creeping like Liquorice, which it resembles both in shape and thickness; but it is whiter on the inside.

BUTUA, or *Parcira brava*, is a Brazilian plant, and the root is woody, hard, contorted, dusky, and wrinkled without, as well lengthways as circularly; within it is of a dusky yellow, and seems to be interwoven with various fibres; so that when it is cut transversely, they appear like so many concentric circles, with several rays or fibres reaching from the center to the circumference. It is without smell, but of a bitterish taste, with a sweetness not unlike liquorice. It is as thick as a man's finger, and sometimes as a child's arm.

It is good in ulcers of the bladder and kidneys, and, when mixed with a little balsam of capivi, it will certainly cure them. Some say it is an excellent remedy in a moist asthma, and the yellow jaundice. The dose is from twelve grains to thirty in substance; and from two drachms to three in decoction.

CARLINA, or *Chamelion albus* of the shops, is a root a palm or two in length, and of the thickness of a man's thumb; it is red without, and has a surface which seems to have been corroded; it is white within, with an acrid aromatic taste, and a fragrant smell. It is brought from the Alps and Pyrenees, and should be chosen fresh, dry, and not carious.

CASUMUNAR is an East Indian root, and is tuberosc. It is thicker than a man's thumb, and is cut into transverse pieces; it is marked on the sur-

face with circles like galangal, and is a little geniculated. It is ash coloured without, yellowish within, with a subacid, bitterish, aromatic taste. What plant this belongs to is uncertain; however it is said to strengthen the nerves, refresh the spirits, corroborate the stomach, and repel wind. It is given in substance from ten grains to thirty, and the tincture from twenty drops to thirty. The extract is also given from six grains to fifteen; but the chief use made of it is to help digestion and dispel wind.

CHINA is a long root, and is so called from the place it is brought from. However, there are now two sorts, one of which is brought from the East, and the other from the West Indies. It is a thick arundinaceous, geniculated, heavy, woody root, beset with unequal tubercles, and the colour without is of a dusky red, but within of a reddish white. The taste while fresh is a little acrid, but when dry it has a small degree of an earthy astringent taste, and without smell; if it is good, it seems to be fat and unctuous when chewed. The plant to which it belongs is called the rough Chinese smilax, or bind weed. The medicinal use of this root is now but little regarded. The American China differs from the former, only it being of a darker colour without, and redder within.

CONTRAYERVA is a root an inch or two in length, and about half an inch thick, and is knotty on the outside; it is hard, thick, reddish or blackish without, wrinkled, and the protuberances are, as it were, covered with scales; it has also many slender filaments, or threads, but within it is pale, and has a somewhat astringent bitterish taste, with a sweet sort of acrimony when it has been held long in the mouth. The tuberosc part is only to be chosen; for the filaments are of no value. It grows in several parts of the West Indies, and is brought to us from Spain. It is a mild alexipharmic, and has been counted excellent against all sorts of coagulating poisons. It strengthens the stomach, helps digestion, and discusses wind; it is also used by some in malignant fevers. The dose is generally a scruple; but it may be given to a drachm and upwards. It is certainly very good to promote a diaphoresis.

COSTUS is by authors said to be of various kinds; but that in use with us is the sweet Costus of the shops, and is brought from the East Indies. It is cut into oblong pieces, which are about the thickness of a man's thumb; which are light and porous, but hard and brittle, and a little resinous. Sometimes it is whitish, and sometimes of a yellowish ash colour, with an acrid aromatic bitterish taste; but the smell is fragrant, and not unlike that of violets. It is said to attenuate viscid humours, to promote expectoration, and is by some reckoned a cephalic, as well as to be good for promoting a diaphoresis and urine; but it is very seldom used.

CURCUMA, *Turmeric*, is a root brought from the East Indies, and is oblong, slender, tuberosc, knotty, and of a yellow or saffron colour; the taste is subacid and bitterish, with a smell like that of ginger, but weaker. It is a very useful root to the dyers; and, as it is very much in request, there is scarce a garden in the East Indies where it is not cultivated: they use it with their victuals as a sort of spice. It is recommended against obstructions of the lungs, liver, spleen, mesentery, and womb; but its principal virtue is against the jaundice, in which it is looked upon as a specific. It is given in substance from a scruple to a drachm, and in infusion to two drachms.

CYPERUS LONGA, *long Cyperus*, is a long slender knotty contorted root, not easily broken; it is blackish without, and whitish within; and of a sweet subacid aromatic taste, with a fragrant smell like that of nard. It is generally brought to us from Italy, and care should be taken that it has a lively smell, and is not carious. There is another root called

round Cyperus, which has been brought from the Levant, and is a roundish and turbinated root, of the size and shape of an olive. It is rough, streaked, reddish without, and sometimes black; but it is white within, and there are several fibres depending from a single head. The smell and taste are the same as the former. Many virtues have been attributed to it; but in the present practice it is seldom used.

DICTAMNUS CRETICUS, *Dittany of Crete*, is a kind of Origany, and is now only used in Venice treacle; it is brought to us from Candy, and is said to grow on mount Ida. There is another sort called *white Dittany*, which is a sort of *Fraxinella*, now of some use in many parts of Europe. The root, or rather bark of the root, is thickish, white, and is generally brought to us wrapped up in the same manner as cinnamon; it is of a bitterish taste with a little acidity, and has a fragrant, and pretty strong smell when fresh. It is said to be an alexipharmic, to promote sweat and urine, to kill worms, and to resist putrefaction. The dose is from half a drachm to two drachms in substance, and in infusion to an ounce.

DORONICUM ROMANUM, *Roman Wolfsbane*, is a tuberose root full of knots and tubercles, which are hardly so big as small hazel nuts; it is yellowish without, and whitish within, and the taste is sweetish, clammy, and a little styptic. It is brought to us from the Alps. As the qualities of this root are not perfectly known, it is not adviseable to admit it into practice.

GALANGA MINOR, *the lesser Galangal*, is a tuberose, knotty, geniculated root, and is divided into branches, as well as encompassed with circular rings; is uneven, hard, solid, and about as thick as the little finger; of a dusky colour without, and reddish within; with an acrid, aromatic, bitter, pungent taste, burning the mouth like pepper or ginger, and has an aromatic or fragrant smell while it is fresh: it is used in the East Indies as a spice. It is a warm stomachic bitter, and is given to promote digestion. It is good to discuss wind, and in all disorders that proceed from a weak stomach. The dose is from fifteen grains to thirty in substance, and from half a drachm to two drachms in infusion.

GENTIANA, *Gentian*, is a root sometimes a foot in length, and near an inch in diameter, but sometimes more; it is dusky on the outside, but of a yellowish red within, and a taste intensely bitter; likewise the substance is a little spongy. It grows among the Alps, Pyrenees, and other mountains, and is brought to us from Germany. Not many years ago there was a poisonous root sold instead of Gentian; but it may be readily distinguished from it, it being of a whitish colour within, and without its bitter taste. Gentian is usually prescribed as a bitter to strengthen the stomach, and to help digestion. The dose is from half a drachm to two drachms.

GLYCYRRHIZA, *Liquorice*, is a root extremely well known almost to every body. The stalks rise to three or four cubits in height, and are divided into several branches, with roundish leaves of a faint green colour. They stand upon the stalks by pairs, that is, one on each side, but at the end there is one that is single. The flowers are papilionaceous, small, blueish, and at the top disposed as it were into a spike. The pistil that rises from the calyx turns into a reddish pod, half an inch long, which has two valves and a single cell containing the seeds, which are small, hard, flat, and in the shape of kidneys.

Liquorice grows spontaneously in Spain, Italy, France, and Germany, and is also common with us in England. The root temperates salt acrid humours, and is good in diseases of the breast. It is often prescribed in decoctions, as well to appease the heats of the fluids as to abate their acrimony. As

for the dose, it is not easily determined; for it is usually chewed by children in large quantities without any bad consequence. The inspissated juice, which is brought from Spain, is of a blackish colour, and is commonly called Spanish liquorice: it has the same virtue as the root, but stronger.

HELLEBORUS ALBUS, *white Hellebore*, is an oblong tuberose root, sometimes as thick as the thumb, dusky without, and white within, with a great number of whitish fibres; the taste is acrid, a little bitterish, subastringent, disagreeable and nauseous. The inward use is not very safe; nor indeed the outward; for when the powder is applied to an issue it will occasion violent purging. When taken inwardly, it is a strong emetic, and has been observed sometimes to occasion convulsions and other terrible disorders. However, in desperate cases, it may be sometimes ventured upon, particularly against madness; and the dose in this disease is a scruple: it ought always to be used with the utmost caution.

HELLEBORUS NIGER, *black Hellebore*, is a tuberose, knotty root, from which as a head many fibres hang, which are thick and black without, but white within, and of an acrid bitterish taste; the smell while fresh is exceeding strong. The inward use of this is much safer than the former, and is accounted a proper purge against melancholic and atrabilarious disorders. It acts particularly on the strait gut, for which reason it promotes the piles.

HERMODACTYLUS, *Hermodactyl*, is a hard tuberose triangular root, or rather in the shape of half a heart, it being flat on one side, and tuberose on the other, terminating as it were in a point; it is reddish without, white within, and is easily reduced into a meal by pounding; it is of a clammy sweetish taste, with a slight acrimony. Hermodactyls are always dried when they are brought to us, and have been thought to purge gross humours, particularly of the joints, whence they have been esteemed as excellent in the gout; however, their purgative quality is but weak. It is given in substance from half a drachm to two, and in decoction to an ounce; but it is seldom or never used alone.

JALAPA, *Jalap*, is an oblong turbinated thick dense root, cut into transverse pieces, and is heavy and blackish without, but within dusky or ash coloured. It is resinous, hard to be broken, and has a taste that is something acrid and nauseous. It is the root of an American convolvulus, and is called by some Mexican night-shade with a large flower. It is in great use as a purge, and is of the stronger sort, though it seldom or never produces any bad consequences. It is best given in substance, because then it operates best; for the resin is apt to occasion gripes, and the watery extract is too weak. It is very useful in a cold phlegmatic habit of body; but is not at all proper in feverish disorders, nor in hot and dry constitutions, nor yet in melancholic, or scorbutic disorders. A scruple is the usual dose to grown persons.

IMPERATORIA, *Masterwort*, is not the same plant called by that name with us, for it is brought from the Alps and Pyrenean mountains; and is an oblong root as thick as a man's thumb, and wrinkled: it is somewhat geniculated, is dusky without, and white within, with a very acrid aromatic taste, violently vellicating the tongue, and heating the mouth; it has a most fragrant smell, but inclinable to what is commonly called physicky. It has been reckoned an alexipharmic, and has been recommended by Casper Hoffman as a divine remedy in the cholic and windy disorders; but it is not now much in use with us.

IPECACUANHA is brought from America, and is of two kinds, the Peruvian and the Brasilian. The Peruvian is not a quarter of an inch thick, is

crooked,

crooked, and as it were rough with circular rings; it is of a light brown or ash colour, and is dense, hard, brittle, resinous, with a small nerve which runs thro' its heart the whole length of the root; the taste is subacrid, bitterish, and with little smell. The Brazilian *Ipecacuanha* is of a brownish colour, and is crooked and rough, with rings like the former, but more rugged, and is little more than the twelfth of an inch in thickness; it is brown or blackish without, but white within, and of a slightly bitterish taste. The *white Ipecacuanha* is a bastard sort, and is slender, woody, without wrinkles or bitterness. It is sometimes imported by the merchants for the true *Ipecacuanha*, but may be readily distinguished from it; for, besides the marks already mentioned, it is of a whitish yellow colour, neither will it work upwards or downwards like the two former. These last are now of great use in the beginning of dysenteries and other fluxes of the belly; but the Peruvian is accounted the best. Eight ounces of the root will yield ten drachms of resin, when the extract is made with spirits of wine. It has formerly been given to the quantity of a drachm; but now from six to ten grains are judged to be sufficient. In a confirmed dysentery, if the doses are so small as not to be strong enough to purge, and given several times a day, it will cure the ulcers of the intestines. It is now more generally used as an emetic than for any other purpose.

IRIS FLORENTINA, *Florentine orris*, is a root which is brought to us in oblong pieces, and it is geniculated, a little flat, white, with a yellow reddish bark, which being taken off, the root has a bitter acrid taste, with a fragrant violet smell. It is sometimes twice as thick as a man's thumb. The *Iris nostras purpurea*, the *common purple flower de luce*, is of the same kind as the former; for the roots, leaves and flowers, are of the same shape, though the colour is different. Florentine orris attenuates and incises the thick lymph lodged in the breast, and promotes its expectoration; whence it is good in the asthma, shortness of breath, and coughs; but it is chiefly used as a perfume, and is often mixed with snuffs. The dose is from a scruple to a drachm. When the juice is snuffed up the nose, it brings away a great quantity of serum; and, mixed with bean meal, it is said to take away freckles.

MECHOACANNA, *Mechoacan*, is a root brought from South America in white pieces, and is covered with a wrinkled bark. The substance is softish with scarce any fibres, and the taste is sweetish, with a little acidity, which sometimes causes a nausea. It has rings somewhat like briony; but differs from it in being compact, and in having no bitter taste, nor a strong disagreeable smell. It was looked upon at first as a most excellent purge, but is not so much cried up now since jalap became in use.

MEUM ATHAMANTICUM, *Spignel*, is an oblong root about as thick as the little finger and branched; it is covered with a bark of a ferruginous colour; but it is pale within, a little gummy, and contains a whitish pith. It smells almost like parsnips, though more aromatic, and the taste is not disagreeable, though it is acrid and a little bitter. It grows among the Alps and the Pyrenean mountains. It is said to attenuate thick gross humours, and is recommended in the humoral asthma; but it is now but seldom used.

NARDUS-CELTICA, *Celtick-Nard*, is a fibrous, capillary, reddish root, covered with small scales, of a yellowish green colour; with an acrid bitterish aromatic taste, and a fragrant strongish smell. It is said to be a carminative, to strengthen a weak stomach, and to help digestion; but it is now chiefly used in Venice treacle and mithridate. The dose is from half a drachm to two drachms.

NARDUS INDICA, *Indign Spikenard*, is a hairy

root, or rather a congeries of slender capillaments adhering to a head, which is about as thick as the finger, and as long, and of the colour of rusty iron; the taste is bitter, acrid, aromatic; and the smell agreeable. It is said to strengthen the stomach, and to discuss wind; but its principal use now is in Venice treacle and mithridate.

NINZIN, and GINS-ING, are generally taken for the same roots, but they are distinct from each other; however, their outer appearance and virtues are much the same; though Gins-ing bears the much greater price. The root of Ninzin is in the shape of a parsnip, is three inches in length, and about as thick as the little finger, with a few fibres proceeding from it. It is pulpy, whitish, and has some faintish cracks on the outside; but below it is divided into two branches. It has the smell of the yellow parsnip, and the taste of skirrets; but it is not quite so sweet, and there seems to be a little bitterish taste. It grows in Korea, from whence it is brought to Japan, and is in high esteem in those parts; for they pretend it is endowed with extraordinary virtues. However, it is of no use with us. Gins-ing is a root of an inch long, and about as thick as the little finger; it is slightly wrinkled, and generally divided into two branches, but sometimes into more, and at the small ends there are slender fibres. It is a little reddish without, but yellowish within, and the taste is subacrid, a little bitterish and aromatic, with an aromatic smell. On the top there are a row of knots placed in an irregular order, which seem to tell the years of its growth. It was thought only to grow in China and Tartary, between thirty-nine and forty-seven degrees of north latitude; but it is now found in Maryland and other parts near it, from whence it is brought to London, and sent to the East Indies, where it bears a great price; for it is confidently affirmed, that in China they will give three pounds of silver for a pound of this root. It is looked upon by the inhabitants as a panacea, and is their last refuge in all kinds of disorders.

PYRETHRUM, *Pellitory of Spain*, is about the length and thickness of a man's finger, and without it is of a blackish red, but it is white within, and has a most acrid burning taste, though it is without smell. This is brought from the kingdom of Tunis; but there is another kind which is more slender, and not so acrid. This root is remarkable for opening the salival ducts, and for procuring plenty of spittle; hence it is by some looked upon as a specific in the tooth-ach, from obstructions and catarrhs. It is likewise good in sleepy diseases, and the palsy of the tongue, when chewed and held in the mouth. It is seldom or never given inwardly except in clysters against sleepy diseases.

RHABBARUM VERUM, *true Rhubarb*, is a root brought to us in thick unequal pieces, from four inches to five or six in length, and three or four thick. It is a little heavy, and of a dusky yellow on the outside, but within it is of a saffron colour, and variegated with yellow in the same manner as a nutmeg; it is a little fungous, of a subacrid bitterish and somewhat astringent taste, with an aromatic smell, but somewhat strong. It grows in China, and though we have had several figures of the plant, it is not certain that any of them are like it, which is somewhat strange, since it grows in all parts of that country, though principally near the great wall; it was formerly brought from China through Tartary to Aleppo, and from thence to Alexandria, and at length to Venice; but we have it now from the East Indies and Russia. There is a sort that was sent to Jussieu, and called *Rhubarb with an oblong curled undulated leaf*. It was said to be the true China rhubarb, and is now growing in the physick garden at Paris; there is also some of it in the physick garden at Chelsea. It was brought to Mr. Rand, the then gardener,

gardener, and was called by him the Rhubarb, with an undulated smooth leaf, like burdock. These were generally thought to be the right sort; but Mr. Miller, the late gardener, affirms, that it was nothing else than the *Rhaponticum*. The faculties of Rhubarb are well known for both its purging quality, and for its general astringency of the stomach and intestines. It is supposed to open obstructions of the liver, and it is excellent in loosenesses. It is so mild, that it may be given to all ages and sexes at all times. However, it is not proper when the intestines are very hot, and there is a feverish heat. It is good in the jaundice, that proceeds from a clammy thick bile, which stops up the biliary ducts. Some chew it in a morning, before breakfast or dinner, to help digestion. It is given in substance from half a scruple to a drachm, and in infusion to two drachms.

The true RHAPONTIC is the *Rhubarb* of *Dioscorides*, and of the ancients, and is by some called the *English Rhubarb*. The impalement of the flower is composed of three small leaves, which are turned back; and the flower itself has three leaves, which are larger than those of the impalement, and are coloured. In the center of the flower is seated the three cornered pointal, supporting three small styles, and attended by six stamina; the pointal afterwards becomes a triangular seed, inclosed by the petals of the flower. It is frequently cultivated in gardens, and of late years the first stalks of the leaves have been used for making of tarts in the spring of the year; but they must have their outward skin peeled off, otherwise they will be very stringy: they have an agreeable acid flavour. When they are propagated for use, they should be planted three feet asunder, and in rich ground.

SARSAPARILLA root is made like a rod of several ells in length, whose twigs are of the thickness of a goose-quill, and are tough, flexible, and streaked lengthways. The bark is thin, and the colour without is reddish, but ash-coloured within; under this there is a white mealy substance, which is so soft, that it may be reduced to powder between the fingers; the taste is bitterish and clammy, but not disagreeable. Under this, in the middle, there is a woody bright tough substance, which is not easily broken. All these twigs or strings proceed from a single head as thick as a man's thumb, and scaly. It is brought from New Spain, Peru, and Brasil. It is sudorific, and attenuates gross humours. It has been reckoned a specific against a well known disease, the gout, the palsy, and other chronic disorders; but its virtues are now most approved against the first. The method of using it is this; to three ounces of the strings, which are good and not spoiled with age or other accidents, three quarts of river-water must be added, and it must be made to boil as soon as possible, in an open vessel, till two pints of the strained liquor remain. This quantity is enough for twenty-four hours, and may be given at two or three times, either warm or cold. It must be made fresh every other day, and the patient's diet should be slender while he takes it. Some have given it from half a drachm to two drachms in substance, and to half an ounce in decoction; but the former method is best. After all, it is not to be wholly depended on for the before-mentioned purpose, unless it receives the assistance of mercury, and that properly prepared by a very skilful hand.

SENEKA is the root of a plant called *Polygala Virginiana*, with oblong leaves and white flowers; but it is known to us by the name of the Rattle Snake-root. It is usually about the thickness of the little finger, and is variously bent or contorted; it is divided into many branches with lateral fibres, and has a prominent membranaceous margin, running length-

ways; it is yellowish without, but white within, and has an acrid bitterish taste, but somewhat aromatic. It is thought to be good in all other disorders proceeding from a thick blood, particularly in the pleurisy and inflammation of the lungs, first letting the patient bleed. It has likewise been prescribed in nervous disorders, and slow fevers, with success. The usual dose of the powder is about thirty grains. It will sometimes vomit and purge; but if the patient cannot bear it, it may be prevented by mixing a testaceous powder with the tincture, or by giving twelve grains of salt of tartar in weak cinnamon water.

SERPENTARIA VIRGINIANA, *Virginian Snake-root*, is slender, fibrous, light, brown without, and yellowish within, with a subacid bitterish taste, and a fragrant aromatic smell, not unlike that of zedoary. It is now reckoned a species of the *Arifolochia*, and is brought from Virginia and Carolina. It consists of a great number of strings or fibres matted together, that proceed from a single head. It is accounted a great alexipharmic, and is frequently given in malignant fevers, and epidemical diseases. It may be given in substance from ten to thirty grains, and in infusion to two drachms.

TURPETHUM, *Turbeth*, is a root, or rather the bark of a root, cut into oblong pieces about as thick as the finger, and is brown or ash coloured without, but whitish within, with a subacid nauseous taste. It is best when it is fresh, resinous, not wrinkled, and easily broken. It belongs to an Indian *Convolvulus*. It has been thought a proper remedy to purge off thick and gross humours from the remote parts of the body, and has been commended in cold chronic diseases, especially in the gout, palsy, and dropsy. The dose is from fifteen grains to a drachm; but an extract made of spirits of wine is best, of which a scruple is a dose: it is now not much in use.

ZEDOARY is a tuberose root that is dense, solid, from three to six inches in length, and about as thick as a man's finger, terminating both ways in a blunt point. It is ash coloured without, and white within, with an acrid, bitterish, aromatic taste, and fragrant smell, which is most remarkable when it is chewed or pounded, and is somewhat like camphire. There is another sort, called round Zedoary, that is in substance, weight, solidity, smell, and taste, like the former; for it only differs in the shape, which is roundish, and only an inch in diameter. They are both brought from China; but the latter is seldom found in the shops. It has been greatly celebrated for its virtues: it promotes sweat, incides gross phlegm in the lungs, as well as in the stomach and intestines; it discusses wind, and cures the cholic proceeding from thence; it raises the spirits, and has been given in several chronic disorders. The dose in substance is from six grains to thirty, and two drachms will serve as an infusion to be drank in the manner of tea.

ZERUMBETH is a tuberose geniculated root, with an unequal surface, and is from the thickness of a man's thumb to that of his arm; it is a little flattish, and of a whitish yellow colour, with an acrid taste, not unlike ginger, and a fragrant smell: it is seldom or never kept in the shops.

ZINGIBER, *Ginger*, is a well known tuberose root, knotty, branched, and flattish, the substance is a little fibrous, of a pale or yellowish colour, and covered with a brownish skin, which is commonly taken off before it is brought to us. The taste is very acrid, hot, and aromatic, with a very fragrant smell. It is brought both from the East and West Indies, where it is looked upon, while fresh, as an excellent remedy against the cholic, loosenesses of the belly, and windy disorders. It strengthens the stomach, helps digestion, and is said to strengthen the

the memory. It is often added to purges, to correct them; but it should not be given in hot constitutions, for then it will do more harm than good. It may be taken in substance from five to fifteen grains, but it is oftener taken in infusion or decoction from half a drachm to half an ounce. The dose of that which is brought over candied, is from a drachm to an ounce.

NATURAL HISTORY of BARKS.

CINNAMOMUM, *Cinnamon*, is a well known spice, it being a bark that is sometimes exceeding thin, and sometimes pretty thick, and rolled up into a sort of tubes or pipes of different lengths. The substance is leginous and fibrous, but brittle; the colour is of a yellowish red, with an acrid, pungent, pleasant, agreeable taste, and a most delightful smell. It is the second and inward bark of a tree called *Canella Zeylanica*. It is commonly taken from trees that are three years old, in the spring or autumn; the ash coloured outside is taken off, and then it is cut into pieces, and exposed to the sun, and, when it is drying, it rolls itself up in the manner it is brought to us. When the tree is stripped of its bark, it continues naked for two or three years, and then another grows again, which serves for the same purpose. When it is distilled fresh, it yields plenty of oil, but when old and dry, very little; however, it is of two sorts, one of which sinks to the bottom of the water, and the other swims on the surface. This last is pale, but the former is of a reddish yellow colour, though they are both limpid, and of a most fragrant smell; but when they are tasted, they are exceedingly pungent. When the bark of the root is distilled, it yields an oil, with a volatile salt, or camphire, which is lighter than water, limpid, yellowish, and soon flies away. It has a strong smell between camphire and cinnamon, and has a very pungent taste. The camphire got from it is exceedingly white, and has a much finer smell than the common sort, but it is extremely volatile, and takes fire immediately, whose flame leaves nothing behind it. The fruit of this tree is an oblong roundish berry, somewhat above a third of an inch long, and is smooth, green at first, but afterwards turns to a dusky blue, sprinkled with whitish specks. Under the green pulp there is a thin brittle shell, containing a roundish kernel. It is common in the island of Ceylon, where it is in as great plenty as hazel trees with us. Cinnamon is heating, drying, aperient, discutient, and alexipharmic; it strengthens the viscera, recreates the spirits, helps digestion, and discusses wind. It is given in substance from a scruple to a drachm, and in infusion from one drachm to two. The oil is so hot and burning, that it is never prescribed alone; but it may be mixed with sugar, and then given with any fluid. The dose is from one drop to three. A single drop on a lump of sugar, is an excellent remedy against hiccoughing. Likewise, if a drop of it be put with cotton into a hollow tooth, it cures the tooth-ach by drying and burning the nerve. Cinnamon, though commonly used as a spice, should be avoided when the stomach is inclinable to an inflammation, for then it does more harm than good; nor is it proper for hot and dry constitutions.

CASSIA LIGNEA, *Woody Cassia*, is a bark brought to us in rolls like cinnamon, and has somewhat of the smell and taste, but weaker, for which reason it may be easily distinguished from it, besides which it is clammy when tasted; however, the best is that which approaches nearest to cinnamon. It has much the same virtues as cinnamon, though in a smaller degree; and when given as an astringent, it is preferred to it, on account of its glutinous qua-

lity; it is good in loosenesses, and to strengthen the viscera. The dose in substance is two scruples, and, when infused in half a pint of white wine, an ounce.

CASSIA CARYOPHYLLATA is the bark of a tree called the *Clove-berry-tree*, and is found in the island of Cuba, and other parts of the West Indies. It is as thin as cinnamon, and of a dusky yellow. It is brought in rolls like cinnamon, and has a taste between cloves and that bark; but that of cloves is the most predominant. It grows stronger by length of time, and at length becomes so acrimonious, that the tongue is affected as though it was burnt with a slight caustic. It has the same virtues as cloves, but fainter.

CANELLA ALBA, by some called *Winter's-bark*, and by others *wild Cinnamon*, is rolled up in oblong tubes, in the same manner as cinnamon, but larger. It is thicker than cinnamon, and has an acrid, pungent, aromatic taste, as if it had been mixed with cinnamon, ginger, and cloves. It is accounted a good remedy against the scurvy; it discusses wind, and is sometimes used in disorders proceeding from catarrhs. The dose is from half a scruple to a drachm in substance, and to two drachms in infusion.

CORTEX WINTERANUS VERUS, *true Winter's-bark*, is brought over in tubes like the former, and has a covering of an ash colour, that is soft, fungous, unequal, and full of chinks; but within it is solid, dense, and of the colour of rusty iron, with an acrid, aromatic, pungent, burning taste, but the smell is extremely fragrant. It was brought from the Straits of Magellan, by William Winter, in 1567. It has been accounted excellent against the scurvy, for which some reckon it a specific. However, it is seldom or never to be met with in the shops, the *Canella Alba* being now used instead of it.

CORTEX PERUVIANUS, *Peruvian or Jesuits bark*, is generally from the sixth part of an inch to the fourth of an inch thick, and is rough on the outside, it being of a brownish colour; but sometimes is covered with a hoary moss: it is smooth within, a little resinous, and of a reddish rusty colour, with an intensely bitterish taste, and somewhat of astringency. Sometimes it is brought in large pieces, three or four inches in length or upwards, and an inch broad, and not rolled up, because it is taken from the trunk of the tree; sometimes inclining to tubes like cinnamon, though but slightly, and is marked with shallow circular chaps or fissures: this is taken from the slender branches. There is likewise a lesser sort, which is yellowish within, and hoary without, which is said to be obtained from the roots, and is in high esteem in Spain. It grows in South America, and particularly in Peru. It was at first greatly celebrated for its febrifuge qualities, and is still in the highest esteem upon that account. However, it has many other virtues, which have been discovered one after another; but that which was first remarked was its power in stopping mortifications. It is given in various forms, for agues of every kind, and its tincture with saffron and snake-root is excellent in nervous as well as in spotted fevers. It is good in the measles, and cures the strumous ophthalmia and hectic fever, and has been found excellent in the epilepsy, as well as the whooping cough, and spitting of blood. It is of great use in a consumption, and in the intermitting putrid fevers of that disease, as also in the hysteric passion. It is good in the king's evil, cures a pimpled face, and malignant ulcers. It is excellent for hemorrhages in general, and for hysteric convulsions. It is useful in tremblings, in languors, against the worms, as well as in a diabetes, and colliquative sweats, in which last case it performs wonders: in short, there is no single remedy yet found out that is endowed with so many

many excellent qualities. However, there is one not yet mentioned, which must not be forgotten, and that is its being an excellent preservative in sickly aguish countries, in all parts of the world, and in sickly seasons. The dose of the bark in powder is half a drachm, though some have given it to two drachms; and if an ounce is infused in a pint of generous red wine, six ounces is a dose; however, it is certain, that when it is given in substance, it is much more efficacious than either in infusion or decoction; but when patients refuse to take it in substance, the infusion in wine is undoubtedly the best. In whatever form this medicine is given, it must always be repeated every third or fourth hour, and in agues must be repeated again in eight days time from the cure. It will be still better to give it a second or a third time, that is, a few doses of it every eight days, and this process is generally necessary for autumnal agues; besides, it must be observed, that no evacuations of any kind must be made after taking the bark for some weeks, or even months after a cure is performed.

CORTEX ELUTHERIÆ is known abroad by the name of *Cascarilla*, has been sold for the Jesuits bark, and it is still called by some the grey Peruvian bark. It is rolled up in tubes of the thickness of the finger, and from two to four inches in length. It is thinner than the Peruvian bark, and is of a white ash colour without, but within of the colour of rusty iron, with a bitter aromatic taste, and a fragrant smell when burnt. It is thought to be good in diseases of the breast, particularly the pleurisy and inflammation of the lungs, as also in loosenesses attending acute fevers. By its sedative quality, it is useful in inflammations, though it is bad in the quinsy. It has produced good effects in internal hemorrhages, and in enormous vomiting, as well as in all fluxes of the belly. The dose is from six grains to a scruple, though it has been given to a drachm three or four times a day.

NATURAL HISTORY of WOODS.

AGALLOCHUM, or LIGNUM ALOES, *Aloes Wood*, is of three kinds, and the first, which is best, is called Calambac by the East Indians. It is light, resinous, and as soft as mastick, for it will stick to the teeth and nails, and will melt over the fire with a very sweet smell; but the taste is bitterish and aromatic. The *Agallochum* of the shops is brought to us in fragments of various sizes, which are heavy, dense, and of a bay colour, variegated with blackish and resinous streaks: sometimes there are holes in it, as if it was rotten; but they are filled with a sort of reddish resin, and then the colour of the wood is of a purplish black. The taste of this is subacid, bitter, and aromatic, and the smell is very agreeable. It grows in the island of Sumatra, in Cambaya, and more especially in Cochin China. It is oftener met with in the shops than the former, because the price of that is exceeding great.

AGALLOCHUM, or LIGNUM ALOES OF MEXICO, is more light, porous, and not so resinous as that of the shops; the colour is of a brownish green, and the smell is sweet and fragrant, not unlike that of the true lignum aloes, but the taste is bitter. It is not only met with in Mexico, but in the islands of Solor and Timor in the East Indies. It is seldom or never taken notice of as a medicine, but is used in making boxes, chests of drawers, and other things of that kind.

LIGNUM RHODIUM, Rhodium Wood, is a name given to woods of several kinds. It had its name from the island from whence it was brought, and was also called Cyprinum, because it was had from the

island of Cyprus. This wood is of a pale yellow at first, but in time grows reddish; it is thick, hard, and solid, and marked with fat resinous knots, smelling like a rose. There is another sort of *Rhodium* brought from the island of Jamaica, and, though it smells like the true, it appears to be different on a careful examination.

GUAIACUM, otherwise called *Lignum Sanctum* and *Lignum Vitæ*, the wood of Guaiac, is solid, dense, heavy, and resinous, whose middle part or heart is of a blackish green, and variegated with pale green, and black colours; but the external part is of a palish yellow like box; it is of a bitterish and somewhat aromatic taste, with a mild acrimony, and the smell, when burnt, is somewhat fragrant, and not disagreeable. The bark is woody, thin, dense, smooth, and somewhat resinous, and consists as it were of several thin plates laid one upon another; the outside is of an ash coloured green, or blackish, variegated more or less with green spots, intermixed with a livid or lead colour; it is pale within, of an acrid taste, and disagreeably bitter. It grows in the West Indies, and particularly Mexico and New Spain: This wood is full of resin, insomuch that a pint of rectified spirit of wine will extract at least two ounces thereof. When it is boiled in water for a considerable time, and afterwards gently evaporated, it will leave a mass that looks something like resin, which is balsamic, of an agreeable smell, and a somewhat acrid taste; when it is quite dry, reduced into powder, and taken as snuff, it will bring a large quantity of serum from the nose; besides which it is very friendly to the nervous parts of the head. *Guaiac* incises and attenuates gross humours, opens obstructions, promotes sweat and urine, strengthens the stomach, as well as all the rest of the viscera, cures inveterate obstructions of the liver and spleen, and is prevalent against the jaundice, dropsy, and other disorders thence arising. It is also good in the gout, rheumatism, and all sorts of pains in the joints. It is a great friend to the nerves, brings all cold hard swellings to suppuration, and yet it is never attended with the least bad consequence. The bark has the same virtues as the wood. Twelve ounces of the wood, macerated in three quarts of water for a day, and then boiled over a gentle fire till half or more is evaporated, and strained off, is called the cream of guaiac. We might here enlarge on its uses in venereal cases, and give the proper method of using it; but as this work is undoubtedly read by the young and inexperienced, such directions might lead the unguarded part of them into experiments destructive of their health and constitutions, since the best medicines, when improperly applied, may tend to hasten death rather than a cure; and, as the learned know where to look for informations of this kind, they will readily excuse an omission, which properly does not belong to Natural History.

LIGNUM TINCTILE CAMPECHENSE, Log-wood, is well known as a dye, and is commonly brought from Campeachy in the Bay of Honduras. It is but lately used as a medicine, and that in loosenesses, in which it is very efficacious; for if two ounces of the chips are boiled in a quart of milk, and a quart of water to one quart, and a tea-cup full of this decoction be given every three hours, it seldom fails to cure a common diarrhoea.

LIGNUM NEPHRITICUM, Nephritic wood, is whitish or of a palish yellow colour, and is solid and heavy, with a subacid and a little bitterish taste; the bark is blackish, and the heart reddish or brownish. The wood has been recommended against disorders of the kidneys, and difficulty of urine.

SANTALUM RUBRUM, red Sanders, is a solid, dense, heavy wood, brought over from the East Indies, sometimes in strait and sometimes in crooked pieces.

pieces. It is the heart of the tree, and has no remarkable smell, but it has a slight astringent, and austere taste. The virtues of these woods is not agreed upon by authors: however, they generally agree, that they are inciding, attenuating, astringent, and strengthening. But the yellow is the most powerful incider, and is more astringent than the red.

SASSAFRAS is the root of a large American tree, and is brought to us in long strait pieces, which are very light and of a spongy taste. It is of a whitish red colour, and the bark is spongy, ash coloured without, but within of the colour of rust of iron. The taste of the wood is acrid, sweetish, and aromatic, with a fragrant smell, not unlike that of fennel. Its virtues are sudorific and inciding, and it is good in the cachexy, green sickness, and dropsy. The oil of Sassafras is good in disorders of the breast, and particularly in coughs, pains, and spasms. It may be taken alone or dropped upon sugar, or a drop or two may be mixed with a powder good for the same purposes. It is a medicine not very commonly known, but exceedingly useful: *Sassafras* is also made use of like tea.

NATURAL HISTORY of LEAVES and FLOWERS.

CORALLINA, *Seamoss*, is a small marine plant, divided into a great number of sprigs, which are slender, brittle, and consist of several joints. Without it seems to be covered with a sort of a whitish stony substance, and the colour is various; for it is either white, reddish, yellowish, ash coloured or black, and sometimes of the colour of grass. It has a nauseous fishy smell, with a saltish disagreeable taste, and crackles between the teeth; it may readily be reduced to powder by rubbing it between the fingers. It is seldom above an inch and a half, or two inches long, and is found growing on rocks in the sea, as well as on stones, shells, coral, and the like. It has no root, and is very plentiful on the shore of the Mediterranean sea. That is esteemed the best, which is whitish or ash coloured. It is greatly cried up for its virtue in killing worms, and is given in powder from half a drachm to a drachm.

SCHOENANTHUS, *Camels Hay*, is brought in sprigs with the leaves, and sometimes with the flowers from Arabia; they are dry, stiff, round, shining, geniculated, and about a foot in length; it is full of a spongy pith, and is of a pale yellowish colour at the root, but near the top it is green or purplish; the taste is hot, subacid, bitterish, aromatic, and not disagreeable. It is now out of use, except as an ingredient in venice treacle and mithridate.

MALABATHRUM, *the Indian leaf*, is like that of the cinnamon tree, and differs nothing from it except in smell and taste. The tree, to which this leaf belongs, is called the white cinnamon tree of Malabar. It is now only made use of in venice treacle and mithridate.

SENNA, or SENA, consists of small dry, flattish, firm, and sharp leaves of a yellowish green. The smell is not very strong, but the taste is subacid, bitterish, and nauseous. It is of two sorts, the Alexandrine and that of Tripoly; which last is the worst, and the leaves are green and large, with a blunt point and rough to the touch. This medicine is in great use as a purge, being seldom or never attended with the bad consequences of drastic purges. It is apt to gripe; for which reason physicians have endeavoured to correct it in various manners; some with ginger, others with cinnamon, and others again with spikenard. Some mix it with prunes, jujubs, raisins, violets, marsh mallows, and polypody of the oak; others with things that discuss wind, and in-

cide gross glutinous humours, such as fennel-seeds, anniseeds, coriander-seeds, and salt of tartar. Senna is not good in those disorders, in which the fluids are hot, and the solids tend to an inflammation, particularly in hemorrhages, all inflammations whatever, and diseases of the breast. In an infusion, or gentle decoction, it is prescribed from a drachm to half an ounce, either alone or with other purging medicines. Some have endeavoured to correct its disagreeable taste by various additions, which however have not succeeded extremely well; particularly, they have recommended the greater water fig-wort for that purpose; but as it has a strong smell, and a nauseous bitter taste, it can do little good this way; while others have recommended bohea tea with as little success.

DICTAMNUM CRETICUM, or DICTAMNUS CRETICA, *Dittany of Crete*, is a leaf, of a roundish shape, about an inch long, and of a greenish colour, and covered with a thick white down. It is generally brought over with the stalks, from whose tops a sort of spike of scaly leaves depend, of a purplish colour. The smell is fragrant and not disagreeable, and the taste is acrid, aromatic, and hot. The dose in powder is from half a drachm to a drachm, and in infusion from a drachm to half an ounce; but it is only used with us in venice treacle and mithridate.

THEA, *Tea*, is a small dried curled leaf, with a taste bitterish in a small degree, and slightly astringent; the smell is very agreeable, and by some is likened to that of new hay, or violets. It is brought from China, and has variety of names; but it may principally be divided into three kinds, namely, the green, the imperial, and the bohea. The green is of several sorts, and is of various degrees of goodness, from the common coarse green tea to the hyson, which is now the dearest and accounted the best of all. The imperial tea is so called, because it is chiefly used by the emperor and great men in China and Japan. The leaf is large, and not so much rolled up as in the other kinds: the colour is greenish, lively, and of a fine smell, with an agreeable taste. This, not many years ago, was in great request with us; but now we either have it not at all, or it is sold under a different name. The bohea is of a reddish brown colour, and the leaf is small, rolled up, and tinges the water of a brownish colour; but the difference of taste of these teas are so well known they need not be insisted on. Some authors assure us there is no difference between the green and bohea teas, but what arises from the manner of curing them; for the bohea is said to be higher dried, or rather burned, from which it receives its different taste and colour. The natives throw the bohea into a brass vessel full of water, and boil it over a slow fire, where they keep it the whole day, and it serves for their usual drink; but these are the common sort, for others are much more nice and careful in preparing it. The Japanese grind their tea into a small powder, and then put a spoonful of it into one of their cups, pouring hot water thereon, and then they beat them together with a sort of a brush composed of long bristles, till a foam arises thereon; but the Chinese make use of it in the same manner as we do. Tea is certainly of some use in abating the acrimony of the humours, and in keeping people awake, but more especially in those who drink it but seldom; however, when others take it late at night, it very often prevents their sleeping sound. It is gently astringent; for which reason it hinders the water from weakening the stomach, and in those that take it but seldom it will prevent the operation of a purge. It has indeed some power in preventing the gravel, but then it does not arise from the tea, for hot water alone will do the same. In general it may be observed, that tea has different effects on different people,

people, and therefore, though it may be good for some, it is hurtful to others.

STOECHAS ARABICA, *French Lavender*, consists of the florid tops of the plant, which, when dried, are called *Stoechas*; they are oblong, scaly, and of a purplish colour, with a subacid bitterish taste, and a fragrant pleasant smell. Though it is called the Arabian *Stoechas* it is brought from the southern parts of France, where it grows spontaneously. It is now cultivated with us by sowing the seeds upon a bed of light dry soil in March. When the plants are come up they should be carefully cleared from weeds, till they are two inches high, at which time they should be removed into a light dry level ground prepared for that purpose, and set at about five or six inches distant from each other, observing to water and shade them well till they have taken root. It has a labiated flower, consisting of one leaf, whose upper lip is upright and cut into two; but the under lip, or beard, is cut into three parts; and both are so divided as at first to appear like a flower cut into five segments, out of whose flower cup rises the pointal, attended by four embryos, which afterwards become so many roundish seeds inclosed in the flower cup. The flowers are ranged in various rows with scaly heads, out of the top of which peep some small leaves which look very beautifully. The *Stoechas* used in the shops is still brought from the south parts of France; but as it is apt to contract a mouldiness in its passage, it is not near so good as that gathered fresh in England. It is recommended in cold disorders of the head and nerves; however, it is rarely met with in prescription, but is used in venice treacle and mithridate.

CROCUS, *Saffron*, grows in various parts of the world, but it is no where better, if so good, as in England. At present it grows plentifully in Cambridgeshire, and in all that large tract of ground between Saffron-Walden and Cambridge. They begin to plough the ground in the beginning of April, and about five weeks after they lay between twenty and thirty loads of dung upon each acre of ground, but the shortest rotten dung is best; and this they plough into the ground. Soon after Midsummer they plough it again, and the time of planting is the latter end of July; the method of which is this: one man with a shovel raises between three and four inches of earth, and throws it before him about six inches; two women follow him with the heads of saffron, and place them in the farthest edges of the trench, which is made at three inches distance from each other. As soon as the digger has gone once the breadth of a ridge, he begins again at the other side, and digging before covers the root last set, and makes room for the setters to place a new row; and thus they go on till a whole ridge is planted. The quantity of roots planted in one acre is generally about a hundred and twenty-eight bushels. When the leaves are ready to show themselves above ground, they pare the ground with a short hoe, and take off the weeds. Some time afterwards the saffron flowers appear, which are gathered before, as well as after, they are full blown, and the most proper time is early in the morning. They carry them home in baskets, spread them on a large table, and pick out the chives with a pretty large part of the style itself; but the rest of the flower they throw away as useless. They then dry them on a kiln, which is built on a thick plank, supported by four short legs, that it may be removed from place to place. It is set in the lightest part of the house, and they begin by laying five or six sheets of white paper on a hair cloth, upon which they spread the wet saffron between two and three inches thick; this they cover with other sheets of paper, and over all they lay a coarse blanket five or six times doubled. At first they give the kiln a pretty strong heat to make the chives sweat. When it has been

dried about an hour, they turn the papers and saffron upside down, covering them as before. The same heat is continued for an hour longer, and then they take off the papers, cover the saffron as before, and lay on a weight. Then they have nothing more to do than to keep a gentle fire, and turn the cakes every half hour till thoroughly dried, which is generally performed in twenty-four hours.

Saffron has a flower consisting of one leaf, which is shaped like a lily, and fistulous underneath, the tube widening into six segments, and resting on a root stalk; the pointal rises out of the bottom of the flower, and is divided into three headed and crested capillaments; but the impalement afterwards turns to an oblong triangular fruit, divided into three cells, and is full of roundish seeds. It has a tuberose root, and long grassy leaves, with a longitudinal white furrow thro' the middle of each. The parts of the flower used in medicine are the long stamina or chives, of a reddish flame colour. Saffron is endowed with great virtues, for it refreshes the spirits, and is good against fainting fits and the palpitation of the heart; it strengthens the stomach, helps digestion, cleanses the lungs, and is good in coughs. It is said to open obstructions of the viscera, and is good in hysteric disorders. However, the use of it ought to be moderate and seasonable; for when the dose is too large it produces a heaviness of the head and a sleepiness; some have fallen into an immoderate convulsive laughter, which ended in death. A few grains of this is commonly a dose, though some have prescribed it from half a scruple to a scruple and a half.

NATURAL HISTORY of FRUITS and SEEDS.

DACTYLI, *Dates*, are oblong fruit of a roundish shape, of the thickness of a thumb and the length of a finger. They are in the form of acorns, and composed of a thin dusky yellow skin, with a fat, firm, sweet pulp, and a thick, oblong, hard stone, furrowed longways. Those are best that are large, soft, yellowish, with few or no wrinkles, and full of pulp. Dates are distinguished according to their degrees of ripeness: the first is when the end begins to grow ripe, the second when it is ripe to the middle, and the third when it is ripe in every part. With regard to the virtues of Dates, they are said to strengthen the stomach, stop loosenesses, and corroborate the intestines; they are also good in diseases of the breast, and promote the expectoration of gross humours. The tree that produces them grows in several parts of the world, particularly in Arabia, Syria, Persia, Africa, as well as in Greece, Italy, and the southern parts of France; but they do not thrive so well in these last places, and the fruit seldom comes to perfection.

SEBESTEN is a fruit not unlike small plumbs, which are blackish, turbinated, pointed at the top, and wrinkled. They consist of a dusky clammy pulp of a sweetish taste, which adheres firmly to the stone. It is in common use in some parts of Europe to abate the acrimony of the humours, and to appease coughs proceeding from a soft phlegm, as well as in hoarsenesses and heat of urine. They are out of use with us, and consequently are not kept in the shops.

UVÆ PASSÆ, *Raisins*, are the ripe fruit of the vine dried in the heat of the sun, and are universally known. There are several sorts, though not all known to us, as the raisins of Damascus, which are the largest; the raisins of Provence, which are of a middle size; and the raisins of Corinth, with us commonly called currants. Those of Damascus are most in use with us, and are named raisins of the sun. There is also another sort brought from Spain,

Spin, which are pretty much in use, called *Malaga raisins*. The vine that produces the larger raisins; like other vines, only the leaves are bigger, and not divided so much on the edges. The common use and taste is known to every one, and as to their physical use, they are said to attenuate gross humours, and to abate their acrimony. Those called *jar raisins*, being stoned and eaten frequently, are excellent in obstinate hoarsenesses. They are sometimes used in decoctions, to abate the disagreeable taste of other medicines.

CARICÆ, dried Figs, are so well known that they need no description. The flowers, which are always inclosed in the middle of the fruit, consist of a single leaf, and are male and female in the same fruit; the male flowers are seated towards the crown of the fruit, and the female, which grow nearer the stalk, are succeeded by small hard seeds. The entire fruit is for the most part turbinated and globular, or of an oval shape, and is fleshy, and of a sweet taste. Fresh figs, as well as those which are dried, serve among other things for food in some distant countries; and when they are ripe, they are easy of digestion, and perhaps more so than any common fruit whatever. They are moderately nourishing, soften the belly, and are good in disorders of the lungs, kidneys, and bladder; however, the too frequent use of them is hurtful, because they generate wind. When they are dried they have the same qualities, but are better for medical purposes. They are sometimes used in pectoral decoctions, and six figs are enough for every pint of liquor. Externally they are sometimes applied in the form of a cataplasm, to disperse or ripen swellings. Some roast them, and apply them to swellings of the gums, and others to ease the pains of the piles.

MYROBALANI, Myrobalans, are of several sorts; but the yellow are principally used in medicine, and are a dried fruit, of an oblong roundish turbinated shape, an inch and a quarter in length, and three quarters of an inch in breadth; they are blunt at both ends, and of a yellowish or citrine colour. They are marked generally with five larger streaks, and as many that are small between them; under the glutinous and as it were gummous bark, or rind, half a quarter of an inch thick, which is bitter, austere, and subacid, there is a stone of a lighter colour, that is angular and oblong, with several pits or cavities; the kernel is whitish, and covered with an exceeding thin dark yellow membrane. The rind or pulp, for they are both together, is the only part in use. They proceed from a tree like that of wild plumbs, whose leaves are set by pairs, like those of the ash tree.

The *CHEBULE MYROBALANS* are the largest, and are oblong, angular, and said to purge phlegm. They are like the former, but bigger, and more turbinated, and have likewise five high ribs made by the streaks or furrows; but they are of a darker colour, and more inclinable to brown; within they are of a blackish red, but taste as the former, though the pulp is thicker, and the kernel is fat, oblong, and of the same taste. They grow on a tree not unlike a peach tree.

Indian, or black MYROBALANS, are less than the yellow, and are marked with nine oblong lines: they are rather wrinkled than streaked, and are blunt at both ends. They are black on the outside, and within are of a shining black, like pitch. The taste is subacid, bitterish, and a little acrid; they adhere to the teeth, and provoke spittle. The tree grows to the size of a wild plum-tree, which has leaves like those of willows.

The *BELLIRIC MYROBALANS* are a roundish fruit, of the colour and shape of a nutmeg, but a little more yellow, and almost an inch in length; the rind is bitter, austere, and astringent; under which

lies a stone of a lighter colour, containing a kernel like that of a hazel nut.

EMBLIC MYROBALANS are a dried fruit, of a round shape, but marked with six angles, and of a blackish ash colour. They are half an inch in diameter, and under the rind, which when ripe opens in six places, there is a white lightish stone of the size of a hazel nut divided into three cells. Generally speaking, there is nothing but the dried segments of the pulp or rind brought over, which are of a blackish colour, and of a tartish austere taste. They grow on a tree higher than any of the former, but we have no accurate description thereof, nor indeed of any of the former. They have been looked upon to have a purgative faculty, without producing the least weaknesses, and by their astringency they strengthen the bowels. The dose is from an ounce to an ounce and a half, but the present practice has laid them aside.

COLOCYNTHIS, Coloquintida, or the bitter apple, is about the size of an orange, of a roundish shape; the pulp when dried is spongy, and, as it were, full of cells; it consists of small membranaceous leaves, which are dry, white, and exceeding light when brought to us. It is of a very bitter, acrid, nauseous taste, and it has small, flat, hard, white or reddish seeds, of the size of those of a cucumber, but rounder and harder; it is brought from Aleppo.

It is now in use as a medicine, and is a most strong violent purge; therefore only proper to be used in desperate cases, and in obstinate inveterate diseases. It has sometimes very dangerous effects, for it greatly injures the stomach, viscera, nerves, and even the whole body. It is often mixed with other purgatives, to render the operation more quick, and particularly with aloes and scammony. The dose of it, when given alone, is from five grains to twenty, when reduced to a fine powder. It has such a purging faculty, that when laid to the navel with oxes gall, it not only purges but kills worms.

CASSIA FISTULARIS, the pudding pipe tree, is an exotic fruit contained in ponds, sometimes half a yard long, and about an inch in diameter; it consists of a woody shell, of a dark brown colour, but though it is hard it is thin. It is divided into several cells with partitions transversely placed, and parallel to each other; the pulp is soft, black, sweetish, and of the consistence of honey, containing oblong, roundish, flattish seeds, that are hard, shining, and of a dusky yellow. Those pods are best that are fresh, full, and will not rattle when shaken. The pulp only is in use, which is taken from the pods, and is passed through a sieve. It is looked upon as a mild, gentle, harmless purge, agreeing with all sexes and ages. The tree from whence it proceeds, has been planted in the West-Indies, but as it does not grow naturally there, it does not succeed very well; for it has a thicker shell, and the pulp is acrid and nauseous. As a cathartic it must be given in a large dose, but a small one is sufficient to keep the body open. Some have complained of its bad effects, and say it produces wind in the stomach and intestines; but by mixing it with cream of tartar, or boiling it with tamarinds, this may be prevented.

TAMARINDI, Tamarinds, are a fruit with a thick clammy pulp, brought to us in masses of a blackish colour, with an acrid taste, and mixed with the rinds of the pods, as well as membranes, nerves, and filaments; as also with the hard seeds or stones. That pulp is best that is clammy, of a blackish red, acrid and moist. It is to be cleansed from the membranes, filaments, and seeds, before it is used. It is brought from Egypt, and the East and West-Indies.

The flower consists of several leaves, which are so placed as to resemble, in some sense, one that

is papilionaceous; but they expand circularly, and from the many leaved flower cup there arises a pointal, which afterwards becomes a flat pod, containing many flat angular seeds, surrounded with an acrid blackish pulp. The pods of the tamarind-tree in the East-Indies, contain six or seven seeds in each; whereas those of the West-Indies have seldom more than three or four. They may be propagated in England, by sowing the seeds on a hot bed in the spring, and when the plants are come up, they should each be set in a separate small pot, filled with light rich earth, and plunged into a hot bed of tanner's bark to bring them forward, observing to water and shade them till they have taken root. They must be constantly kept in the bark stove both winter and summer. When rightly managed, they will grow to the height of three feet in one summer from the seed. Tamarinds, besides their purging quality, temperate the acrimony of the humours, abate the heat of the bile and blood, quench thirst, and are good in acute burning fevers. They serve to correct the faults of violent purgatives, and to quicken those that are sluggish. The dose is from one drachm to an ounce, and in decoction from one drachm to three ounces.

CARDEMOMUM, *Cardomum*, is of several kinds, of all which some account will be given. The seeds of the greater Cardomum are contained in a dried oblong fruit, about the size of a fig, and much of the same shape, with a broad circular navel at the top, divided in the middle into three parts, and including in a thin, membranaceous, tough, fibrous, wrinkled, brown or reddish colour, a great number of seeds in three cells, which are uneven, shining, reddish, and lodged in a sort of membranes that lie between them.

The middle-sized CARDOMUM of *Matthioli*, or the greater Cardomum of *Bontius*, is an oblong fruit, of the length of an inch or an inch and a half, but slender, triangular, streaked and blunt at the top; it is of an ash colour, not easily broken, and divided into three cells that contain a great number of seeds, wrapped up in thin white membranes. It is oblong, angular, thin, and on one side divided by a sort of small pipe, and there are several transverse lines run across it. It is of a reddish white colour, with an acrid aromatic taste. This sort is very common.

The lesser CARDOMUM of *Matthioli* is the *Cardomum* of the ancient Greeks, and is a dried fruit with a short membranaceous pod, not half an inch in length, of a triangular shape, but sharpest at the pedicle, and blunt at the extremity; it is of a reddish colour, streaked, and has a much thinner shell than the middle-sized Cardomum. When it is fully ripe the three corners gape, and discover three cells, containing a double row of angular, wrinkled, reddish yellow seeds, but white within, and of an acrid, bitterish, aromatic taste, somewhat like camphire. It is brought from the East-Indies. In the places where they all grow they are used as spices, and are said to help digestion, to strengthen the stomach and brain; and to promote urine. The dose is from ten grains to a scruple in substance, and in decoction to half an ounce. They are much used in the present practice, that is the greater sort, and are a very warm grateful spice.

AMOMUM VERUM, the true *Anomum*, brought from the East Indies, is a dried fruit growing in small bunches, consisting of ten or twelve berries or membranaceous bladders, which are fibrous, and brittle, lying close to each other without pedicles. The bunch is supported by a woody sprig, which is fibrous, round, and the length of a man's thumb. It is adorned with leaves, as well as a row of small scales, where there are no berries, and there are six long leaves surrounding each berry or grape like a

flower cup. Three of the longest leaves are half an inch in length, but the other three are smaller, and scarce shew themselves above the grapes. The thickness and shape of the berries are like that of a middle sized grape; each contains three rows of seeds, separated from each other by a thin membrane, and each row consists of several angular seeds, wrapped up in the same thin membrane, and lying so closely together, that they appear to be only three long seeds. The whole bunches are of a wood colour, but paler in some than others. The seeds are solid but brittle, and the smell is fragrant, not much unlike that of lavender, but sweeter; however, when they are taken out of their shells, the smell is more acrimonious, and they have an acrid taste. They are said to contain many virtues, but at present are only used in venice treacle.

CUBEBAE, *Cubebs*, of the shops, are a fruit, or round dried grains like pepper, and sometimes bigger, with a long slender pedicle, and a wrinkled, darkish ash-coloured shell, containing a single seed of a roundish shape, blackish without, and white within, with a sweet, acrid, aromatic taste, but not so hot as pepper. They are said to be good in diseases of the head, to create an appetite, to strengthen the stomach, and to disperse wind. The dose is from three grains to a scruple, and infused in wine, from a drachm to two drachms.

PIPER, *Pepper*, is of several kinds, as *black pepper*, *white pepper*, *long pepper*, and *Jamaica pepper*.

PIPER NIGRUM, *black pepper*, is a dried fruit or grain, of the size of a small pea, with a wrinkled, brown or black rind, which taken off, a hardish compact substance appears of a yellowish green colour, but white within; the taste is acrid and hot, and seems, as it were, to bite the tongue. It grows on a shrub, with a small, fibrous, tough, blackish root, which sends out many shoots that are tough, flexible, green, and woody, which lie on the ground like hops, unless they are propped up; there are several knees, or knots, which when they lie upon the ground will send out shoots; and at each knot there are leaves alternately disposed, and opposite to each other, that are roundish, two or three inches broad, and four long, terminating in points; the texture is thick and firm, and on the upper part they are of a shining dusky green; but beneath of a light green, and have short, thick, green pedicles. The flowers grow in bunches, and are monopetalous, but divided into three parts at the edges, to which succeed the grains, which are ten, twenty, or thirty in number upon one pedicle, and are green at first, but red when ripe; but in drying they grow black and wrinkled. When the rind of black pepper is taken off, it becomes white, and is the only sort brought to us by the name of white pepper. Black pepper is met with in Java, Sumatra, and on all the coasts of Malabar.

Long PEPPER is an unripe dried fruit, about an inch or an inch and a half long. It is oblong, round, cylindraceous, and, as it were, streaked with spiral lines, with tubercles placed in the form of a net; within it is divided into several small cells, containing each a small round seed, scarcely the twelfth of an inch in breadth, blackish without, but whitish within, with an acrid, hot, bitterish taste.

Long pepper is commonly pickled, and is in high esteem among some. It is very good in cold phlegmatic constitutions. They have all much the same virtues; for they heat, dry, attenuate, resolve, open and strengthen relaxed fibres of the viscera; and by exciting an oscillation therein, refresh the spirits, divide gross humours, and increase the circulation of the blood.

PIMENTA, *Jamaica pepper*, by some called all-spice, because it has somewhat of the taste of every one, is a dried unripe fruit, of a roundish shape, and

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generally somewhat larger than black pepper; the skin is brown and wrinkled, with a navel on the top, which is divided into four parts, and contains two black kernels covered with a greenish black membrane. The taste is a little acrid, aromatic, and somewhat like that of cloves. It grows in several parts of the West-Indies, is gathered while green, and dried in the sun for many days; but they are taken in night and morning, to avoid the dew. It is used as a spice, strengthens the stomach, helps digestion, and refreshes the spirits.

CARYOPHYLLI AROMATICI, *Cloves*, are a dried unripe fruit, somewhat in the shape of a nail, and a little quadrangular, wrinkled, and of a blackish red. On the top there is a head, much about the bigness of a very small pea, which is composed of scales wrapped one into another, and round about it there are four small leaves, not unlike a flower cup, and disposed like a star, between which, in a cavity, there is a small quadrangular style of the same colour. The taste is acrid, bitterish, and agreeable, with a most fragrant smell. Cloves are the flower cups and embryos of the fruit before the flowers are expanded, and are gathered from the month of October to February. When fresh, they are of a dark red, for they come blackish by being dried in the sun and by smoke. They grow in several islands of the East-Indies, which are all now in the hands of the Dutch. Its principal use is as a spice, though it is said to be good against all cold disorders of the brain, swimming of the head, and weakness of sight; it is also good for a cold stomach, and hysterical disorders. The dose in substance, is from three grains to a scruple; but in infusion, from thirty grains to two drachms.

ACAJOUS, or CAJOUS, by some called the occidental anacardium, and by the French the *nut of Acagous*, but by the English the *cashew-nut*, is a fruit, or rather a nut, of the shape of a kidney, and of the size of a chesnut; it is covered with an ash-coloured, or brown skin, about a twelfth part of an inch thick, hard and tough; it seems to consist of a double membrane with a fungous substance, which in its cells contains a sort of oily fluid of the consistence of honey; it is of a reddish colour, extremely acrid, bitter, and biting; for if a drop of it falls on the skin, it seems to burn it like a caustic; and if any one through ignorance should bite the nut, the lips and tongue are immediately affected with a very sharp pain. Under this is the kernel, which is covered with another brown skin of the thickness of paper, whose substance is extremely white, compact, oily, and of a more agreeable taste than almonds. The tree that produces this nut is one of the best fruit trees in all America, some of which are of the size of standard apricot-trees; and sometimes are pretty regular, but generally the branches are crooked, knotty, and are strangely contorted among each other. The wood is greyish, pretty strong, tough, and heavy; the bark is thin, smooth, and of a dirty white, a little variegated with brown specks and lines. The leaf is large, firm, well fed, pretty thick, and more round at the top than at the bottom. The flowers are small and grow in tufts, and when they are opened they are divided into five leaves, which form a flower cup of small stamina of a yellow golden colour, that surround a pistil of the same colour but longer; the leaves that compose the flower are whitish at first, and afterwards turn to a purple mixed with white lines; but they are of small duration, for the pistil soon changes to a fruit. The tree, either spontaneously or cut, yields plenty of gum, that is reddish, transparent, and solid; it will dissolve in water like gum-arabic, and supplies the place of glue; when the juice is expressed from the fruit and fermented, it becomes a sort of heady wine, which greatly promotes urine, and the spirit dis-

tilled from it is very good. The thick fluid above-mentioned tinges linen of a rusty iron colour, which can hardly be got out. Some get an oil out of it, which will stain linen with a black colour that can never be got out, and if any wood be smeared with it, it preserves it from rotting. The oily fluid first taken notice of is used for taking off warts and corns, when mixed with the black wax of Gaudaloupe, or warm water. The ladies make use of it to take off freckles, for it soon destroys the cuticle, which is succeeded by one that is fair and of a good colour. When the kernels are put into water, the skin will readily come off, and then they are fit to eat; but when they are dry, they open it a little with a knife, and then lay them over the fire, by which means the skin may be easily taken off. They are in very high esteem among the inhabitants of the West Indies, not only to eat by themselves, but to make mackaroons and marchpains; besides which, they give to rosa solis and other liquors a very fine flavour. They may be transported to any distant country, and will continue good for many years.

BEN, is the *Balanus Myrepica of the shops*, and is a nut of the size of a hazel-nut, but of different shapes, for it is sometimes oblong, roundish, or triangular; it is covered with a whitish shell, which is pretty thick and brittle, and contains a kernel covered with a fungous skin as white as snow, and of the same consistence as an almond; it is fat and of a bitterish taste. Eight pounds of the kernels will yield thirty ounces of a yellow limpid oil by expression. This nut is of great use among the perfumers for extracting the fine smell out of flowers, because it will never grow rancid, and has no smell of its own.

CACAO, or COCAO, the chocolate-nut, are oblong, roundish, and of the size of olives; and are covered with a thin, hard, brittle, blackish shell, which being taken off there remains a firm, dense, dry, flattish kernel, of a dusky yellow on the outside, and reddish, or of a bay colour within. They consist of several pieces closely united together, and have a little bitterish and slightly acerb, but not a disagreeable taste. Some take notice of four sorts of the trees, which grow spontaneously and without any cultivation, in many parts of America between the tropics; particularly near the river of the Amazons there are whole forests of them. The wild cocoa-tree is very large, and thick of branches; but those that are planted are cultivated in such a manner, that they never exceed twelve or fifteen feet in height, not only that the fruit may be gathered more easily, but that they may not be too much exposed to the wind. The leaf is generally eight or nine inches long, and sometimes more, but seldom less; and the breadth is one third of the length. It is pointed at both ends, and has a strong stalk two or three inches long. It is of a lively green above, but deeper beneath, and the edges, from the place where it is broadest to the point, is of a very fine flesh colour. The fibres or nerves are like those of the cherry tree. This tree is an evergreen. It bears fruit twice a year, as well as most of the trees in these parts of America; but more properly speaking, it is never without flowers or fruit; however, the produce is most plentiful near both the solstices, but that near Christmas is always the best. The flower is small, and has six leaves when opened, which form a small cup, in the center of which is a longish button, surrounded with five filaments and five stamina. The leaves of the flower are of a pale flesh colour variegated with red spots and specks; the filaments are of a reddish purple, and the stamina are of a fine silver colour; but the button is of a duller white, and it is this that produces the fruit. The flowers do not proceed from the branches, as in the European trees, but from the root up to one

one third part of the five large branches. The fruit that succeed these flowers resemble cucumbers, and are pointed at the end; but on the sides there are furrows like those on melons, among which are small unequal tubercles, and these contain the nuts before described; besides which they contain a substance or pulp, of a palish colour, which is very light and delicate, and of the same taste as pomegranates. Within this pulp are the nuts, of which there are twenty-five in number in each pod. The trees are in greatest perfection when they are ten or twelve years old, not because they bear more, but the largest fruit. The chief use of these nuts is for making chocolate, which is every where very well known, and is said to have restorative qualities; for which reason it is good in consumptions, prepared with milk, for then it abates the acrimony of the humours.

PISTACHIA, *Pistachio nuts*, are of the size and shape of hazle-nuts, only they are a little angular, and higher on one side than the other. They are covered with a double shell, the outermost of which is membranaceous, dry, thin, brittle, and reddish when ripe; but the other is woody, brittle, smooth, and white, under which is a kernel of a pale greenish colour, and of an oily, bitterish, sweetish taste, and agreeable to the palate; it is covered with a red skin. It grows in Persia, Arabia, Syria, and the East Indies; and is cultivated in Italy, Sicily, and the southern parts of France. They yield good nourishment, and are said to be restorative, causing those that are fallen away to regain their flesh very soon. They have been used to make emulsions in the same manner as almonds.

PINEI NUCLEI, *Pine-apple nuts*, are oblong, round, white, fat, sweet, covered with a reddish coat, and are included in a thick hard shell. These nuts are contained in the pine-apple, or cones, between their hard and woody scales. They contain a great deal of oil, which may be gained by expression; and are said to be very nourishing, but they are not easily digested. Some account them good for consumptive patients, because they destroy the acrimony of the humours; they are also good in heat of urine, and in ulcers of the kidneys and bladder.

COFFEE is a hard seed in an oval form, and somewhat above a third of an inch long, and a quarter of an inch broad; one side is convex and the other flat, marked with a remarkable furrow. It is yellowish or of an ash coloured palish green, it has a farinaceous taste, and before it is roasted has not much smell. The cup of the flower consists of one leaf, which is divided at the top into five segments, and the flower likewise consists of one leaf in the shape of a funnel, and divided into five segments; the flowers are succeeded by berries, which split in the middle. The coffee-tree is propagated by seeds, which should be sown soon after they are gathered, otherwise they will not grow, which is the reason that all other countries, except Arabia, have been so long without it. It was necessary to get trees that were growing, which has been at length done, and there are now many of them as well in Europe as in America; but they succeed best in the Caribbee islands; however, the coffee is not accounted so good as the Arabian. The berries are commonly ripe with us in April, at which time they should be sown in pots of fresh light earth, covering them about half an inch thick with the same; and then the pots should be plunged into a moderate hot bed of tanner's bark, observing to refresh them often with water; as also to raise the glasses in the heat of the day to admit fresh air; and in very hot weather it will be proper to shade the glasses with mats.

The blossoms, or flowers are white, and shoot out just where the stalks of the leaves join the branches; when the blossoms fall off there remains a small fruit,

which is green at first, but as it ripens becomes as red as a cherry, and not unlike one; and it is very good to eat, being strengthening and refreshing; under the flesh of the fruit, instead of a stone, there is the berry, covered with a fine thin skin. When the fruit has been dried by the sun, the pulp becomes a shell of a deep brown colour, under which there is a thick brown liquor extremely bitter. Some direct the taking off the pulp of the berries before they are sowed, but this is a mistake; for they will come up sooner when it is left on, and produce stronger plants. There are two seeds in each berry, which seldom fail to grow; but, when the plants are young, they may be easily parted and set in different pots, and about an inch and a half high. In the winter season they should be placed in a bark stove, and kept up to the heat proper for pine-apples. In Arabia they bear ripe fruit twice or thrice in a year. The use of coffee is now well known every where, and the liquor made with it is generally supposed to be good in weaknesses of the stomach, in want of appetite, and in the flatulent cholic. It prevents sleepiness, and is good in sleepy diseases, for which reason it refreshes the brain and the animal spirits. It is good for those that are fat, and abound with thick gross humours; but with those that are lean, and have hot constitutions, it does not so well agree, nor yet with those of melancholy dispositions.

NUX MOSCHATA, or **NUX MYRISTICA**, the *Nutmeg*, is very firm and compact, and yet is very easily pounded in a mortar. It is wrinkled without, and somewhat of an ash colour; but within it is variegated with a whitish yellow, and a bay colour, running in veins without any regularity. The trees that bear nutmegs are now entirely in the possession of the Dutch, as are all the spice islands; they are like pear trees, and have an ash coloured bark, with a spongy wood. The flowers, or blossoms, are yellowish, with five leaves, not unlike those of cherries; to these succeed the fruit, hanging to a long pedicle. It is somewhat like a walnut, and the kernel, or nutmeg, is covered with three coats, the first of which is fleshy, soft and juicy, about as thick as a man's finger, but villous and red, and variegated with yellow, gold colour, and purple spots, like a peach. When it is ripe it gapes spontaneously, and is of an austere taste. Under this there is another reticular covering, or rather divided into several parts, which is of an oily clammy consistence, and as it were cartilaginous, but thin, of an agreeable aromatic smell, and of an acrid aromatic taste, with a sort of bitterness. It is of a saffron colour, and is what we call **MACE**. Between the clefts of this there is a third covering, which is a hard, woody, thin shell, of a dusky reddish colour, and brittle, and in this the nutmeg is contained. It is soft at first, but grows dry and hard in time. The taste and smell is too well known to need a description. The principal use of nutmegs is as a spice, and they are good to promote digestion, to stop vomiting, to disperse wind, and to ease pains of the cholic. However, the immoderate use is bad, for it will affect the head, and produce sleepy diseases, as they have found by experience in the East Indies. When toasted they have a binding quality, and are good in fluxes of the belly, and are given to the quantity of a drachm.

NUX VOMICA, the *Vomit nut*, is round, flat, depressed, about an inch broad, and a quarter of an inch thick; it is of a hard horny substance, of an ash colour, and a little downy without, with a navel on the middle of each side; but one side is flatter than the other, and the taste is bitter; it is brought from the East Indies with snake-wood. It is of no use in medicine.

CARTHAMUS, *Bastard Saffron*, produces seeds that

that are sometimes used in medicine; but the flowers very seldom, for they are chiefly used as a dye. It agrees with thistles in most of its characters, only the seeds are always without down. It is greatly cultivated in Germany, and is brought into England from thence, for the use of the dyers. It is sown in the open fields in the spring of the year, and when come up they hoe it out thin, as we do turnips, leaving the plants about eight or ten inches distant every way. These plants divide into a great many branches, each of which bears a flower at the top of the shoot, which when fully blown they pull off, and is the part the dyers make use of.

SANTONICUM SEMEN, *Worm seed*, is a gross powder, consisting of oblong, scaly, yellowish, green grains, of a disagreeable bitter taste, with somewhat of an aromatic acrimony; the smell is a little aromatic, but nauseous, and there seem to be diminutive leaves and exceeding small streaked stalks among it. Its chief virtue is against worms, besides which it is said to strengthen the stomach, discuss wind, and excite an appetite; the dose is from a scruple to a drachm.

ANISUM INDICUM STELLATUM is a fruit in the form of a star, which consists of six, seven, or more capsulæ, meeting like rays in the center; it is of a triangular shape, and from near half an inch to an inch in length, and from a quarter to near half an inch broad. It is a little flat and united at the base, being composed of a double rind, the outermost of which is hard, rough, wrinkled, and of a bay or rusty colour; but the inside is hard, smooth, and shining, and has two valves, which gape on the upper part in those that are dry and old. There is in every one a kernel, which is smooth, shining, oblong, flat, and near a quarter of an inch long, and a twelfth broad, of the colour of linseed, which in a slender brittle shell contains a whitish, fat, sweet flesh, or pulp, agreeable to the palate, and of a taste between aniseed and fennel-seed, but stronger. The capsula has the taste of fennel mixed with somewhat of an acidity, and the smell is like it, but more fragrant. It is brought from China, Tartary, and the Philippine islands, and has the same virtues as aniseeds and fennel-seeds, but stronger. They strengthen the stomach, discuss wind, and promote urine.

NATURAL HISTORY of LIQUID RESINS.

THE fluids that flow spontaneously from any plant or tree, or from the wounded bark, either concrete into a resin, or gum, or are somewhat of a middle nature between a gum and a resin, which ought carefully to be distinguished from each other.

A resin is a fat, oleaginous, inflammable substance, that will not dissolve in water, but will in oil or spirit of wine. It is of two sorts, for one is clammy, liquid, and tenacious; and the other dry and brittle, which however will grow soft with heat.

A gum is a concreted juice that readily dissolves in water, but will neither melt nor take fire. A gum resin is that which will dissolve equally in water or oil, or at least for the greatest part, and is composed of resinous and gummy particles.

OPOBALSAMUM, *Balm of Gilead*, is a liquid resin, of a very light yellowish colour, and of a fragrant smell, not unlike that of citrons, but the taste is acrid and aromatic. Authors have long disputed where this balsam is produced; but it is certain, that it is now only to be met with in Arabia Felix, and has different virtues according to its age, for when fresh it has a much greater efficacy than when old. It is given inwardly against putrefaction of the viscera, and abscesses of the lungs, liver, and kidneys. The dose is from two scruples to a drachm.

It also cleanses foul ulcers, and heals them in a short time; but it is hard to be met with genuine, and very little that is so is brought over to us.

BALSAMUM PERUVIANUM, of which there are two or three sorts, as the *Balsamum Peruvianum album*, the white Balsam of Peru, that is fluid, and thinner than turpentine, but of a clammy consistence, and is resinous, inflammable, limpid, and of a yellowish white colour. The taste is a little acrid and bitterish, but the smell is sweet and fragrant, approaching to that of storax. It is brought from Spanish America.

BALSAMUM PERUVIANUM FUSCUM, brown Balsam of Peru, is fluid, resinous, clammy, and nearly of the consistence of turpentine; the colour is brown or of a reddish black, with a most fragrant smell like that of benjamin; but the taste is subacid, and a little pungent on the tongue. It will readily take fire and flame, the smoke of which smells extremely agreeable. That which is quite black is bad. They both are the juice of the same tree, and the one proceeds from the wounded bark of the tree; but the other is obtained by boiling. They cut the wood, bark, and branches, into very small bits, and then boil them in water for a considerable time; when the water is cold, the balsam will swim on the top, which they put in shells, and keep for use. The dose is from four drops to twelve in an asthma, consumption of the lungs, and fits of the gravel. Outwardly they ease pains proceeding from cold humours, and are excellent in healing wounds.

BALSAMUM TOLUTATUM, *Balsam of Tolu*, is a resinous clammy juice, of a middle consistence between a fluid and a solid; the colour is bay, inclining to that of gold; it has a most fragrant smell, and the taste is sweet and agreeable, for it does not create a nausea like other balsams. It is brought in small gourd shells from South America, and particularly from Tolu. In length of time it becomes dry, hard, and brittle. It has the same virtues as balsam of Peru, and is of great use in consumptions of the lungs, and internal ulcers. It is very efficacious in curing wounds, and serves to make what is called the ladies black sticking plaster now so much in vogue.

BALSAMUM COPAIBA, *Balsam of Copivi*, is a resinous liquid juice, and while fresh is of the consistence of oil, but in time it grows thick and glutinous. It is of a yellowish white colour, with an acrid, bitter, aromatic taste, and of a fragrant smell. It is brought by the Portuguese from Brasil into Europe. It is often adulterated with turpentine, but may readily be known from it when taken; for it does not give the violet smell to urine as that does. It abates the acrimony of the humours, enriches poor blood, and it both inwardly and outwardly heals all manner of wounds. It is also good in disorders of the lungs, and is excellent in appeasing coughs. It is given in a bolus with sugar and powder of liquorice, from five to twenty drops.

LIQUIDUM AMBARUM, *liquid Amber*, is a resinous, liquid, fat juice, of the consistence of turpentine, and of a yellowish red colour; it is of an acrid aromatic taste, with a fragrant smell, not unlike storax. It is brought from New Spain, Virginia, and other parts of America. It was formerly of great use among perfumers, but is now laid aside, and is seldom met with in the shops.

STYRAX LIQUIDUS, *liquid Storax* is a resinous juice, of which there are two sorts in the shops, the one pure, and the other impure or thick. The best is of the consistence of turpentine, and semi-transparent; the colour is brown, or of a reddish brown, and sometimes of an ash coloured brown, with a strong smell like storax; but it being so violent it is disagreeable, and the taste is a little acrid, aromatic,

and oleous. The impure storax is a resinous juice, full of dregs, and of a brownish or ash colour; it is also opaque, fat, and has not so strong a smell. It is the produce of a particular tree, growing near Suez in Arabia, whose bark they strip off every year and boil in sea water to the consistence of bird-lime, and then they take off the resinous substance swimming at the top. It is in like esteem among the eastern people; it is said to have the same virtues as the former balsams, and is given from three drops to twelve to heal internal ulcers; but it is more commonly used outwardly for wounds, bruises, and ulcers.

TEREBENTHINA, *Turpentine*, is of several kinds, and there are four kept in the shops.

TEREBENTHINA CHIA VEL CYPRIA, *Chio Turpentine*, is a resinous liquid juice, of a whitish yellow colour, inclining a little to blue; it is sometimes transparent, and sometimes of a pretty firm consistence, and sometimes soft, thick, and glutinous. The taste is a little bitterish and acrid, and the smell is also acrid but not disagreeable. The best is brought from the islands of Chio and Cyprus. The use of this, as well as of the other turpentine, is both external and internal; externally it is emollient, discutient, resolvent, cleanses ulcers, and heals recent wounds. But it is generally prescribed inwardly, and is remarkable for healing ulcers of the stomach, intestines, liver, kidneys and bladder. It is good in an old cough, for purulent spitting, and the beginning of a consumption. It promotes urine, gives it a violet smell, and is good in heat of urine. The common dose is from half a drachm to a drachm and a half, in the form of a bolus, or dissolved in the yolk of an egg.

TEREBENTHINA VENETA, *Venice Turpentine*, is a resinous, liquid, limpid, clammy substance, thicker than oil, but more liquid than honey; it is a little transparent like glass, and of a yellowish colour; the smell is resinous, fragrant, and acrid, but not disagreeable: the taste is acrid and bitterish. It is called Venice turpentine, because it was formerly brought from Venice; but now from Savoy, and the southern parts of France.

TEREBENTHINA ARGENTORATENSIS, *Straßburg Turpentine*, while fresh is more liquid than the former, and is more transparent, not so clammy, and has a finer smell, something resembling that of citrons; but the taste is more bitter, pretty much resembling that of citron peel; in time it grows yellowish and thick. It flows from the tree called *abies-taxifolio*, that is, the fir with the leaf of the yew tree; not only from its trunk and boughs, but also from certain tubercles within the bark. That which proceeds from the trunk is the worst, and when dry it resembles frankincense in colour and smell, but that which proceeds from the incision of the tubercles is best. It has the same virtues as Venice turpentine, though some think it is more efficacious, and it is given in the same manner.

TEREBENTHINA COMMUNIS, *common Turpentine*, is more thick and tenacious than any of the former, and is not so transparent; it has a resinous strong smell, with an acrid, bitterish, nauseous taste. It proceeds from the pine-tree, either spontaneously or from incisions. The white resin, called by the French *galipot*, is commonly mixed with wax for the making of flambeaux. When the white resin is melted with common turpentine, and oil of turpentine, the composition is called Burgundy pitch. In some places, the trunks of the old pine-trees that are still standing, have a ditch made round them and set on fire, which forces out a fluid well known by the name of tar, of which tar-water is made, lately so much in vogue, for the curing almost all sorts of distempers. All sorts of resins being set on fire, produce soot, which preserved, is known by the

name of lamp black. All sorts of resins, as well liquid as solid, are emollient; digestive, resolvent, and serve to make plasters and ointments for the curing of wounds and ulcers.

NATURAL HISTORY of SOLID RESINS.

ANIME *vel* ANIMUM, *Gum Anime*, is improperly called a gum, for it is nothing but a resin, and is either oriental, or occidental. It is a transparent resin, and is brought in fragments of various colours, for some are white, others reddish, and others brown. When kindled, it has a pleasant smell, and is brought from Arabia to us. We know nothing of the tree that it proceeds from, nor are we certain that this is its proper name.

AMINE OCCIDENTALIS SEU AMERICANA, *American Anime*, is a white resin, a little inclining to the colour of frankincense. It is more transparent than copal, but more oleaginous. It is of a most grateful and sweet smell, and when thrown upon live coals soon burns away. It is brought from New Spain, Brasil, and the American islands. Some apply this outwardly, when dissolved in oil or spirits of wine, to strengthen the nerves.

BENZOINUM, *Benjamin*, is a dry, hard, brittle, inflammable resin, consisting of various bits, some of which are yellowish, others whitish, in the same mass; it has a resinous taste, with a sweet fragrant smell, especially when it is set on fire. There are two sorts, one of which is pale, or of a reddish yellow, containing white grains like almonds; the other is blackish, with few or no spots. It is brought from the kingdom of Siam, and the islands of Java and Sumatra; that of the lightest colour is best. Its principal use is as a perfume, though it is good in disorders of the breast, promotes expectoration, and appeases coughs. The flowers of *Benjamin* promote sweat, and are good in the asthma. The resin is used externally to strengthen the head, stomach, and nervous parts, when made up into a plaster; the tincture is of great use in taking off tubercles and redness of the face.

CAMPHORA, *Camphire*, is a resinous fatty substance, white, light, and transparent, and is brought to us in a sort of loaves or masses, six inches long and one or two thick; it has an acrid, bitterish, aromatic taste, and yet with a sense of coldness: the smell is fragrant, somewhat like rosemary, but much stronger. It is so volatile, that when exposed to the air it will diminish by degrees, and at length fly quite away. It easily takes fire, leaving no earth, or any thing else behind it, when it has done flaming. It is brought from Japan into Holland, and from thence dispersed all over Europe. In the East Indies it is distinguished into two sorts, namely, that which is brought from Japan or China, and that which is produced in the islands of Borneo and Sumatra; but this is very dear and uncommon, and is seldom or never brought to us. It is produced from a tree like a laurel, but of a very large size, for it grows to the bigness of an oak tree. Camphire may be got from any part of it, for it flows through incisions like other resins, but in some places the country people cut the root and wood into small bits, pouring water upon them, and boiling them in an iron vessel, with a head fixed thereto made of straw, to which when it is sublimed it sticks like soot. However, it is coarse when first brought over to Europe, and is cleansed by the Dutch. The virtues of camphire are very great, especially in the hands of a skilful physician: for it is an alexipharmic, and is both anodyne and diaphoretic, without heating the body or disturbing the circulation of the blood; neither does it occasion thirst, nor render the urine of a higher colour, as hot medicines will. It

has also an anodyne and soporiferous quality, and is good in pains, madness, and spasms, often producing wonders. The dose is from three grains to a scruple, given in the form of a bolus, or dissolved in oil of sweet almonds. It is used externally, when dissolved in spirits of wine, in rheumatic pains and inflammations; it is also good against burns and scalds.

CARANNA, *Caranna*, is a resinous substance; as ductile as pitch when it is fresh, but when old it is hard and brittle, of a blackish ash colour without, and brown within; it has a resinous bitterish taste, somewhat like myrrh, and when kindled has a fragrant smell. It is brought from America in masses wrapped up in a sort of leaves. It is only of outward use, and is said to resolve tumours, ease pains, and strengthen the nerves. It is made into a plaster and laid to the temples for the tooth-ach, and on the top of the head for the head-ach.

ELEMI, *Gum Elemi*, is a yellowish resin, or of a greenish white, pretty hard on the outside, but within soft and clammy, and is brought to us in masses of a cylindrick form; when set on fire it has a strong but not disagreeable smell, somewhat like fennel. This is the *true elemi* that was brought from Ethiopia, and is now seldom to be met with in the shops.

ELEMI AMERICANUM, *American Elemi*, is sometimes whitish, sometimes yellowish, and sometimes greenish. It is somewhat transparent like resin, and has a strong smell like that; this is very common in the shops, and is only used outwardly for resolving tumours, dissolving ulcers, and easing pains. It is particularly recommended against diseases of the head and tendons, especially the ointment prepared with it, which is called the balsam of Arcaus.

RESINA HEDERÆ, the gum of the ivy tree, is a resinous, dry, hard, compact, brown or rusty coloured substance, somewhat transparent; it is broken into small fragments, among which some are of a reddish colour; the taste is subacid, a little astringent and aromatic, but it has no smell. It is brought from Persia, and other oriental countries.

LADANUM or LABDANUM, *Labdanum*, is a resinous substance, of which two kinds are met with in the shops, one of which is brought in large compact masses, and is of an agreeable smell, with a reddish black colour. It is wrapped up in bladders or skins; but the other sort is without any, and is of a contorted shape, somewhat like a screw, and is dry and brittle; but when heated by the fire is a little soft, and is mixed with a kind of black sand. It is of a black colour, and weaker than the former, but is most commonly met with amongst us. Outwardly, labdanum is emollient, and is used to strengthen the stomach and promote digestion; but it is very seldom used.

MASTICHE, *Mastich*, is a dry resin, of a pale yellowish colour and transparent; it is brought in tears of the size of small peas, and is brittle at first between the teeth, but when warm it sticks thereto; and when thrown upon live coals it takes fire, emits a pretty good smell, and the taste is slightly aromatic, resinous, and subastringent. That is best that is pale, yellowish, transparent, dry, brittle, and has a pretty strong smell; but the black, green, livid, or impure, is good for nothing. Some physicians have commended mastich for strengthening the fibres of the viscera, and abating the acrimony of the humours. Some give from a scruple to half a drachm, in spitting of blood and inveterate coughs. Externally laid to the temples, it is said to cure the tooth-ach.

OLIBANUM, *Olibanum*, is of a resinous substance, of a pale yellowish colour, and transparent, it is brought in tears like mastich, but bigger, and is of

a bitterish taste, and pretty acrid, but not disagreeable, and of a fragrant smell. It readily takes fire, and flames a long while. That is best that is whitish, transparent, pure, shining, and dry. Some have accounted it a specific against a pleurisy, and commend it in disorders of the head and breast, especially coughs and spitting of blood. The dose is from a scruple to two drachms. A drachm of it, put into an apple, roasted under the ashes, and given to the patient, has been observed to cure those who have been given over in a pleurisy; but then they must be well covered in bed in order to sweat. If the first dose does not succeed, another must be given in six hours time. It is accounted a good vulnerary, and therefore is mixed in various plasters.

SANDARACHA, *Gum Sandarach*, is a dry, inflammable, transparent, resinous substance, of a pale yellow colour, and brought in tears like mastich. The taste is resinous, but the smell when it is kindled is fragrant and sweet. That is best that is yellowish, transparent, and shining. It is brought from the coast of Africa, and has much the same virtues as mastich, but is seldom given inwardly; nor is it very often applied outwardly. When powdered it is well known by the name of pounce, which is rubbed over paper to prevent the sinking in of the ink, and to render the writing more fair; it is also an ingredient in some sorts of varnish.

SANGUIS DRACONIS, *Dragons-blood*, is a dry, brittle, resinous substance, melting easily, and as readily taking fire. It is of a dark red, but when powdered is of an elegant crimson; when drawn into thin plates it is transparent, but is without taste or smell, unless when kindled; for then the fumes smell somewhat like storax. There are two sorts in the shops, one of which is hard and in masses, about an inch long, and half an inch thick, and is wrapped up in long narrow leaves. Dragons-blood in tears and drops is generally mixed with bark, wood, earth, or other heterogeneous substances, and then made into masses, or loaves, as some call them. There is another counterfeit sort, that maybe readily distinguished from the true, for the masses are of a dusky red colour, and made up of several sorts of gums, tinged with Brasil wood. It will not flame, but when placed over the fire rises in bubbles, and being put into water dissolves therein. That is best that is shining, of a darkish red, wrapped in leaves, and when powdered is of a fine red shining colour. It is brought from the East Indies, and is produced by four different trees; however, that which is genuine will dissolve only in spirits of wine and in oils. It is of an astringent quality, and is excellent in all sorts of hæmorrhages whatever; the dose is from half a drachm to a drachm, and when applied outwardly dries up ulcers, heals wounds, and fastens loose teeth; it is also of use to painters, in making a red sort of varnish.

STYRAX SOLIDUS, *Storax*, is a resinous substance, of which there are two kinds, *Storax Calamite*, and *Common Storax*.

STYRAX CALAMITA, *Storax Calamite*, is a resinous, shining, solid, somewhat fattish substance, which is composed of reddish and whitish grumes or grains, of a resinous, acrid, but not disagreeable taste, and a most fragrant smell, especially when thrown on live coals; it takes fire readily, and emits a very bright flame.

STYRAX VULGARIS, *Common Storax*, is of a yellowish red, or brownish colour, which is shining, fat, and a little clammy, and is brought in masses mixed with whitish grains; it has the same smell and taste as the former. There is also another sort of storax which is mixed with saw-dust, and this is now commonly sold in the shops, and is oftener met with than the true. It is good in diseases of the

breast, and is said to strengthen the brain, refresh the spirits, and restrain their inordinate motions; it has also an anodyne faculty, and is good in pains of the head, and inveterate coughs, by abating the acrimony of the humours. The dose is from half a scruple to half a drachm.

TACAMAHACA, *Tacamabac*, is a resinous, dry, fragrant substance, of which there are two kinds in the shops, but that in shells is the best. It is a little soft, sometimes pale, sometimes yellowish, and at other times greenish. It is brought in shells, which seem to be of the gourd kind, and covered with leaves. It has a most fragrant aromatic and very sweet smell; but it is seldom met with in the shops. The common sort consists of whitish grains, or glebes, but they are sometimes yellowish, reddish, greenish, or variegated with all those colours, and semi-transparent. The smell is much like the former, but not so disagreeable, and it is brought from New Spain. It is seldom or never given inwardly, but is applied outwardly for easing of pains arising from cold flatulent humours; it resolves and ripens swellings, and restrains fluxions on the eyes, and other parts of the face. When laid to the temples, it is much praised by some for curing the tooth-ach, and on being applied to the stomach, it strengthens it, and assists digestion.

NATURAL HISTORY of GUMS.

GUMMI ARABICUM, *Gum Arabick*, is brought over to us in tears, or drops, of different colours, some of which are pale, others yellow, and others red, with a wrinkled surface, and brittle, and which shines like glass when broken. When held in the mouth it sticks to the teeth, and dissolves readily in water, but has no taste. It is produced by a tree called the *Acacia Vera*, or the *Egyptian Thorn*, and is brought over from Arabia, Egypt, and other parts of Africa. The best is whitish, or of a palish yellow, shining, dry, transparent, and free from filth. When it is brought over in large reddish dirty masses, it is only fit for mechanical uses. It will not dissolve in spirits of wine, or oil, and in the fire it burns to ashes without flaming, whence it appears to consist of a mucilage and earth; whence it is good in hoarsenesses, coughs, salt catarrhs, spitting of blood, the stranguary, and heat of urine. The dose is from a scruple to two drachms. When a powder of this gum is wanted, it must be beaten in a red hot mortar, and then the powder of it may be exhibited for internal use.

GUMMI SENECA, *vel SENICA*, *Gum Seneca*, is not unlike gum arabick, and is called Senega, because it is brought from a province of Negroeland, bordering upon the river Senegal. We now have it in great plenty, and at present the whole trade is in our own hands, but from what tree it is obtained we are uncertain, though perhaps it may be a kind of an acacia. The white and smaller tears of this gum are often sold for the true gum arabick; and there is no great cheat in the matter; for their qualities and properties are much the same.

TRAGACANTHA, **TRAGACANTHUM**, and **DRAGACANTHUM**, *Gum Tragacanth*, is a gummy juice, sometimes brought over in long strings variously contorted and bent, and sometimes in small grumes, or bits; it is white, semi-transparent, and sometimes yellowish, reddish, or blackish. It is dry, but not very hard, and without either smell or taste. It is brought from Cyprus, Asia, and Greece. That in strings like worms or singlass is best, when it is white and free from filth. It serves for the same purposes as gum arabic; and it is observable that a drachm of it will thicken a pint of water, full as much as an ounce of gum arabick, it being altogether a mucilage without any earthy parts. It is

good in dry sharp coughs, hoarsenesses, and other disorders of the breast, arising from an acrid lymph; as also in the stranguary, and ulcers of the kidneys; it is also of use to abate the heat of the mouth and tongue, and to heal the painful chaps of the nipples. It is best taken dissolved in some convenient water, and the dose is from half a scruple to two drachms. It is never used externally, but serves the apothecaries for making troches.

MANNA, *Manna*, is a sort of gum, which flows spontaneously from several sorts of trees, and afterwards congeals into grumes in the form of an essential oleous salt; it not only proceeds from the ash and quicken-tree, but also from the larix, pine, fir, oak, juniper, maple, olive, fig-tree, and other plants; for which reason it differs in form and consistence, according to the place and tree from whence it was gathered; for some is liquid, and of the consistence of honey, and another sort is concreted into grains like maltich, and another again into grumes or small masses. *Manna* is also divided into the Oriental and European, the first of which is brought from India, Persia, and Arabia.

MANNA CALABRA, *Calabrian Manna*, is sometimes in grains, sometimes in tears, and sometimes in grumes or small masses; it is brittle and whitish while fresh, and somewhat transparent; but in time grows reddish, and in moist weather turns to the consistence of honey; it is as sweet as sugar, with a kind of an acidity. That is best which is white or yellowish, light and concreted into grains or grumes in the shape of icicles; but that which is fat, like honey, or blackish and dirty, is not good; for sometimes this is counterfeited with coarse sugar, honey, and a little scammony; likewise that which is white, opaque, solid, heavy, and not in the shape of icicles, is bad, because it is nothing but sugar and manna boiled together. This counterfeit sort may easily be distinguished from the true by its density, weight, opacity, and taste. This manna in Calabria and Sicily flows spontaneously from two sorts of ash-trees, and is found on the boughs and leaves in the summer months, unless prevented by rain. When the weather is dry, it flows from the trunk and large boughs of these trees, from the twentieth of June to the end of July, and from noon till evening, in the form of a limpid fluid, which concretes into various grumes, and grows white and dry. They gather it the next day, scraping it off with wooden knives, if the weather is fair; but if it should chance to rain, the manna is lost. When July is past, they make incisions into the bark of the ash and quicken-trees, and from noon till evening a liquid flows out, which concretes into thicker grumes, which are sometimes very large, and require a day or two to bring it to a proper consistence; this is redder than the former, and is sometimes blackish, on account of the earth and other filth mixed therewith.

MANNA DI FRONDE flows spontaneously in July and August, from about the nervous fibres of the leaves, which being dried in the air concrete into whitish grains of the size of wheat; inasmuch that in August the greater leaves of the ash-tree look white, as if they were covered with snow; however, this is very scarce, on account of the difficulty of gathering it. The virtue of manna is well known, it being a mild laxative purge, and is thought to dissolve gross humours, and to abate their acrimony; whence it is good in catarrhs and coughs, proceeding from an acrid phlegm. It is also good in disorders of the breast and lungs, when stuffed with clammy humours. It is also useful in the pleurisy, inflammation of the lungs, and tension of the belly, from a thick hot bile. The dose is from one ounce to three, and Hoffman, in some particular cases, has given to four.

NATURAL HISTORY of GUM RESINS.

AMMONIACUM, *Gum Ammoniac*, is a concreted juice, of a middle nature between a gum and a resin; it is composed of little lumps, or masses, shining here and there with bits that are milk white, or reddish; but the substance itself is a little brownish, and not unlike benjamin; but it is sometimes in tears. It is sometimes yellowish on the outside, and of a yellowish white within; the taste is sweetish at first, but afterwards bitterish, and the smell is fragrant, not unlike that of galbanum, but stronger. When chewed, it grows whiter and whiter by degrees, and when thrown upon burning coals, it will flame; it will dissolve in vinegar or hot water, and is brought from Alexandria in Egypt. The tears are best for internal use, especially when pure, dry, and without mixture. Ammoniac incises gross humours, and is good in the asthma, in crude tubercles of the lungs, and is in general a great aperient. The dose is from half a scruple to a drachm, in the form of an emulsion, electuary, bolus, or pills. Outwardly it is discutient, and is of great use in ripening tumours.

ASSA-FŒTIDA is a kind of gum resin, and is of the consistence of wax; it is frequently bought in large masses, full of shining, whitish, yellowish, reddish, flesh-coloured, or violet spots. It has a very strong smell, somewhat like garlick, and has a bitter, biting, acrid taste. It is brought from Persia, and the East-Indies, and that is best which has the strongest smell, and seems to be composed of tears reduced into masses. It proceeds from the wounded root of a tree, but never from any other part, and at first it is as fluid as cream, and of the same colour; but being exposed to the air and sun, it becomes brownish and thick. It is prescribed in the flatulent cholic, hysterical disorders, and for promoting secretions. It is diaphoretic, and promotes sweat; it is good in disorders of the nerves, and is of some use in a palsy. The dose is from twelve grains to a drachm, and even to two drachms.

BDELLIUM, *Bdellium*, is a gum resin, which is brought to us in masses of several shapes and sizes, and has somewhat of the appearance of myrrh, it being of a rusty reddish colour; but in the inside it is a little transparent. It is brittle, of a bitterish taste, and has no disagreeable smell when kindled; it will flame for a considerable time, with a sort of a crackling noise. It is a good emollient, and is effectual in dispersing tumours of the glands.

EUPHORBIIUM, *Euphorbium*, is a resinous gum, and is brought to us in drops, or tears, of a pale yellowish, or gold colour; are bright, and of different shapes and sizes, with a most acrid, burning, nauseous taste; but without smell. It is brought from the inland parts of Africa to Sallee, from whence it is transported into Europe. It is a most violent and dangerous purge, and often produces fainting and cold sweats; for which reason various methods have been used to correct it, which are not worth mentioning, because in whatever manner it is given it is never safe.

GALBANUM, *Galbanum*, is a fat substance, as ductile as wax, and is shining and semi-transparent, it being of a middle nature between a gum and a resin. It is of a whitish colour while fresh, but afterwards grows yellowish or reddish. It has a bitter acrid taste, with a strong smell. That is best which is fresh, fat, pure, and moderately viscous. When taken inwardly, its virtues are not unlike gum ammoniac, but weaker; however, it dissolves thick phlegm, for which reason it is good in an asthma, and old cough; it discusses wind, is good in the cholic, and opens obstructions of the womb. Externally, it softens and ripens swellings, for which reason it is mixed in various plasters; being applied

to the navel, it mitigates hyfteric disorders, and spasmodic motions of the intestines. The dose is from one scruple to two.

MYRRHA, *Myrrh*, is a gum resin, brought to us in grains or masses of various sizes, some of which are as big as a hazel-nut, and some as large as a walnut; the colour is yellow, or rather of a rusty red, and semi-transparent. The taste is bitter, sub-acrid, and aromatic, but nauseous, with a strong smell, which strikes the nose when it is pounded or burnt. The best is brittle, light, of the same colour, bitter, acrid, and of a pretty strong smell. It strengthens the stomach, helps digestion, discusses wind, and is good in all cold cachectic diseases, catarrhs, and all sorts of ulcers. It is given in substance in the form of a bolus, or pills, from half a scruple to half a drachm. Externally it attenuates, discusses, and is an excellent vulnerary; it cleanses old ulcers, preserves them from putrefaction, and cures the caries of the bones. It is bad in all sorts of hæmorrhages, as well as in spitting of blood, and ought not to be given to women with child, except with great caution. The tincture of myrrh is most in use, and is given from five drops to half a drachm. When outwardly applied, it often prevents gangrenes and mortifications; and that, which is improperly called the oil of myrrh, is good against freckles and pimples on the face.

OPOPANAX, *Opopanax*, is a gummy and resinous juice, concreted into grains about the size of a pea, which are reddish without, and within of a whitish yellow; the taste is intensely bitter and acrid, and the smell is strong. The best is in shining, fat, brittle tears, of a saffron colour without, and whitish or yellowish within; it is brought from the East-Indies, but we know not from what plant. It takes fire like resin, and dissolves in water, where it turns it of a milky colour. It incises gross viscid humours, discusses wind, and loosens the belly; it is good in hypocondriacal disorders, obstructions of the viscera, and is an ingredient in the gummous pills of the shops. The dose is from a scruple to a drachm.

SAGAPENUM, *Sagapenum*, is a juice between a gum and a resin, and is sometimes brought in grains, but more frequently in larger masses, which are reddish on the outside, and within are of the colour of horn; it has a biting acrid taste, with a strong smell, and seems to be of a middle nature between assa-fœtida and galbanum. It will flame when held to a candle, and will dissolve entirely in wine vinegar and hot water. That is best which is transparent, reddish without, and within full of whitish or yellowish specks, and which grows soft when handled. It is good in disorders of the breast, arising from a gross phlegm; as also in hard callous swellings, especially of the nervous parts. The dose is from a scruple to half a drachm.

SARCOCOLLA, *Sarcocolla*, is a gummous juice, and somewhat resinous; it consists of small whitish grains, or of a whitish red, that are spongy, brittle, and now and then mixed with shining specks; the taste is subacrid and bitter, with a disagreeable nauseous sweetness. It softens between the teeth, and when held to a candle it first bubbles, but afterwards breaks out into a clear flame, and yet it dissolves in water. It is brought from Persia and Arabia.

NATURAL HISTORY of JUICES extracted by ART from PLANTS.

ALOE, *vel SUCCUS ALOES*, *Aloes*, is of three sorts, the *Succotrine*, the *Hepatic*, and the *Caballine*. The first is brought from the island of Succotora, near Arabia, and is the best and purest

purest of them all; it is of a reddish or saffron colour, and when broken is shining, and, as it were, transparent; the taste is bitter, astringent, and somewhat aromatic, with a strong, but not disagreeable smell. The *Hepatic* is dense, dry, opaque, and of the colour of liver, with a strong smell and taste. *Caballine*, or *Horse Aloes*, is the worst of all, and is heavy, dense, black, and full of sand; it has an exceeding bitter nauseous taste, and a very strong disagreeable smell. The best *Succotrine Aloes* is shining, transparent, fat, and brittle in the winter, but in the summer a little softer, and is of a yellowish or purple reddish colour, but when powdered is of a shining gold colour, with an aromatic bitter taste, and a strong aromatic smell, almost like myrrh. *Succotrine Aloes* is the best for internal uses, and the *Hepatic* for external, but the *Caballine* is only for horses. Aloes in general is not only a purge, but is a remedy against disorders of the bile; but if it be given in too large a dose, or too often, it is apt to create hæmorrhages, and particularly the piles. Aloes has this peculiar property, that a few grains of it will loosen the body as much as a scruple. Some give it from one scruple to two scruples in substance; but the most common way of taking of it is in tinctura sacra.

SCAMMONIUM, *Scammony*, is a concrete resinous and gummous juice, and is a noted purge. There are two sorts, one of which is brought from Aleppo, and the other from Smyrna; the first is light, spongy, brittle, and of a blackish ash colour, shining when broken; when it is pounded it turns to a whitish or ash coloured powder; it has a bitterish acrimonious taste, and a very strong smell. *Smyrna Scammony* is more dense and heavy, and of a black colour. However, that Scammony is best, which will readily break and powder, and bites, or burns the tongue very little, but when mixed with spittle turns whitish like milk. The black, heavy, and impure, is bad. All strong purges are in some sense or other dangerous, and this in particular is not without its bad effects; for sometimes it purges too violently, and at other times not at all; it is sometimes attended with sickness, and produces wind, as well as occasions thirst and a fever. Therefore the best way is to grind it with sugar, so as to divide its resinous particles, and then it may be given safely to ten or twelve grains.

GUMMI GUTTA, *Gumboge*, is a concreted juice, partly of a resinous, and partly of a gummous nature; it is inflammable, dense, dry, hard, shining, opaque, and of a yellowish saffron colour; it is brought over in pieces of various sizes, and has very little or no taste. It will dissolve both in wine and water, in which last it will turn a little milky, and yet tinge any thing with yellow. When held to the candle it will flame, and emit a copious smoke. It is reckoned among the violent purges, and brings away ferous humours, as well upwards as downwards, and that speedily, though it will not gripe. It is frequently used in the dropsy, cachexy, jaundice, catarrhs, and other chronic disorders. It has been given from two to fifteen grains, and from two to four grains it will not vomit, but from four to eight grains it will both vomit and purge without violence, especially if plenty of water gruel be drank after it. The best way is to give it either in a bolus or pills; however, it should be used with caution, especially because vomiting will not suit with some patients.

OPIUM, *Opium*, is a concreted resinous and gummous juice, which is heavy, dense, clammy, inflammable, and of a blackish colour. It has a strong soporiferous smell, with an acrid bitter taste, and is usually brought over in roundish cakes about an inch thick, and weighing from half a pound to a pound, which are wrapped up in poppy leaves. It is

brought from Natolia, Egypt, and the East Indies. Authors differ greatly about the effects of Opium; however, it is certain that in a proper dose it will generally procure sleep, and ease pain; we say generally, because it will keep some waking, and prevent sleep; though at the same time it will ease their pains. Too large a dose, that is a few grains, will not only produce sleep, but blunt all the senses, hinder breathing, and prevent the patient from ever waking again. It is doubtless a most useful remedy, and will stop the process of many diseases; but then it is palliative only, and never cures any. It is exceeding hurtful to the weak, and should never be given where the motions of the patient are languid; likewise in some cholics it has often produced paralytic disorders; for which reason it should never be given to infants, and persons weakened with age. When exhibited in a proper dose, it excites an agreeable sensation, and inclines to mirth, like a moderate quantity of wine; for which reason the Turks always take large doses of it when they are going to engage in a battle. It stops all sensible evacuations for a time, except sweating, and enlarges the pulse. When too large a dose has been taken, it will be best to bleed and vomit, if the strength will permit; and then acids must be given, as vinegar, and the juice of lemons, or spirits of vitriol, properly diluted. Some cases will require strong sneezing powders, and blisters or sinapisms applied to the soles of the feet and nape of the neck, with painful frictions, scarifications, or burnings. The dose is generally a grain, but in some cases two may be given.

ACACIA VERA, *True Acacia*, is an inspissated gummous juice, brown or blackish without, and reddish or yellowish within; it is of a hard firm consistence, of an austere astringent taste, and is brought over in round masses, weighing from four to eight ounces. It is brought from Egypt. It is said to strengthen the stomach, stop vomiting and looseness, as well as some sorts of hæmorrhages, by abating the acrimony of the humours, and strengthening the solid parts. The dose is from half a drachm to a drachm, in some convenient liquor.

CATECHU, improperly called Japan earth, is a gummy, resinous, inspissated juice, of a reddish black without, and a brownish red within, with an astringent bitterish taste, but no smell. There are two sorts, whereof one is better than the other, and melts more readily in the mouth. It is brought from the East Indies, is a moderate astringent, strengthens the gums, and is good in small ulcers of the mouth, as also in coughs and hoarseness. It strengthens the stomach, helps digestion, and is good in loosenesses. The dose is from half a scruple to a drachm.

SACCHARUM, *Sugar*, is of several sorts, which are so well known to every one that they need no description. Some are great enemies to Sugar, and affirm, it produces we know not what bad effects; but as those who have used it very freely, have never received any damage from it, we may conclude it to be entirely harmless. Compositions of Sugar are allowed on all hands to be good in disorders of the breast, and that, mixed with oil and sweet almonds, it is good in coughs, hoarsenesses, and the like. Externally, Sugar is a very great vulnerary, especially when mixed with a little brandy, for then it will heal wounds, cleanse ulcers, and prevent putrefaction.

TARTARUS, or **TARTARUM**, *Tartar*, is a saline hard substance, of an acrid and subaustere taste, which adheres to the bottoms and sides of wine vessels, from whence it is scraped off. It is of two sorts, the white and the red, both of which proceed from wines, of the same colours. The best Tartar is heavy, hard, with that part next to the

wine

wine rising into chrystalline points, but when broken appears like sponge, or pumice stone, it being porous and mixed with earth, though it is a hard shining substance.

Tartar unprepared is seldom or never used internally; but is taken when purged, and then it is called cream or crystals of tartar; and is good to temperate the heat of the bile, and to quench thirst in burning fevers. It attenuates gross humours, opens obstructions of the viscera, and is good in cachectic and hypochondriac disorders. It is a laxative, and is often mixed with milder purges with success. When given from half a drachm to two drachms it is an aperient only, but from half an ounce to an ounce it is a purge. Cream of tartar will not dissolve in cold water, but it will in hot.

Salt of Tartar, which is procured by calcining tartar in an open fire, is a fixed alkali, and somewhat of a caustic quality. It serves for many chemical operations, and especially to extract the resinous and sulphureous parts of medicine in making of tinctures. When given alone, dissolved in a sufficient quantity of water, the dose is from twelve grains to half a drachm; it will attenuate gross humours, and cure the heart-burn proceeding from acids in the stomach. Among the medicines that are usually procured from tartar, are soluble tartar, vitriolated tartar, and emetic tartar.

NATURAL HISTORY of TUBERA, FUNGI, and Substances that adhere to certain VEGETABLES.

TUBERA CERVINA, or **BOLETUS CERVINUM**, *Deers Balls*, is a tuberose fungus, without a root, and is of a dusky yellow, with a hard, thick, and granulated rind; but the inside is of a purplish white. It is of the size of a walnut, though sometimes of that of a hazel nut, or less; and it is divided into cells that are soft and downy, in which are exceeding small seeds, lying together in a mass, and connected with filaments; when this substance has lost its seeds, it is then contracted into a small round ball. The smell and taste when fresh are rank, but when dry and laid up for some time, they become almost insipid. They are of little use,

for they are never eaten, nor have they any remarkable qualities to recommend them for physical purposes, whatever authors have said to the contrary.

AURICULA JUDÆ, or **FUNGUS SAMBUCINUS**, *Jews-ear*, is a membranaceous fungus, in the shape of an ear, from whence it has its name. It is a spongy substance, growing at the bottom of old alder trees, and is light, coriaceous, and membranaceous; it is ash coloured beneath, and blackish on the top, and the taste is earthly and flat, but it has no smell; it has little or no pedicle, but sticks close to the body of the tree. It is said to be astringent and drying, but is seldom or never taken inwardly.

AGARICUS, or **FUNGUS LARICIS**, *Agaric*, is a fungous substance, of a roundish, angular, unequal shape, and of different sizes, from the bigness of a man's fist to that of his head. It is very light, as white as snow, and may be readily rubbed into meal between the fingers; but it has a few fibres, and a callous ash coloured reddish rind, whose lower part is perforated by exceeding small seeds that lodge in the holes; the taste is at first sweetish, then bitter, acrid, and nauseous, with a slight astringency. It grows to the trunk of the larch tree, and is seldom or never found on the boughs. The best is white, light, and brittle. It goes under the denomination of a purge, though some deny it has any such quality, and is at best a useless medicine.

AGARICUS PEDIS EQUINI FACIE, *Touch-wood*, or *Spank*, grows to the ash and other trees; but that is supposed to be the best that grows to old oaks that have been lopped, and which has been gathered in August and September. This has of late been mightily cried up for stopping of blood upon the amputation of a limb, without making any ligature; but it has had the fate of many new discoveries, and is now almost entirely laid aside; though it might doubtless be of use in many cases. The inward part is best which feels to the touch like buff, which must be taken out, and beaten a little till it may be easily teased between the fingers. This being done, so much of it must be applied to the wound as will somewhat more than cover it, and over this a broader piece must be laid with proper bandages.

C H A P. II.

Containing the NATURAL HISTORY of INDIGENOUS HERBS, PLANTS, SHRUBS, and TREES, and their various uses in Medicine.

INDIGENOUS plants are those which are produced in our climate, some of which have been, or are, used in medicine; while others are quite useless, at least as far as is hitherto known; and therefore they may be passed over in silence. In giving an account of them, we shall observe an alphabetical order, that each of them may be more readily found.

ABROTANUM MAS, *Southernwood*, of which there are two kinds of use in medicine, one of which is called the male, and the other the female; but the first of these is properly the Southernwood. In its characteristics it is much the same as wormwood, and its root is woody, with a few fibres proceeding from it. It has many branches, which sometimes rise to the height of four cubits, though they are generally much lower; they are hard, brittle, and full of a white pith, somewhat of a reddish colour, and are streaked and branched. It has many leaves, somewhat broader than those of fennel; and

those below are divided into several parts, but those above have only one or two segments. They are of a hoary colour, with a strong agreeable smell, and a bitterish taste. The flowers on the sides of the branches are like those of wormwood, and consist of many small blossoms that are tubulated and divided at the top into five parts, in each of which there is a single seed, and they are all comprehended in a scaly cup. It is cultivated in gardens, by slips or cuttings, planted in the beginning of April on a bed of light fresh earth, observing to water them two or three times a week, till they have taken root. These leaves are often used in fomentations.

ARBOTANUM FEMINA, by some called *Santolina*, and *Chamæcyparissus*, *Lavender Cotton*, has a thick, hard, woody root, from which there proceed branches above a cubit in height, which are woody, slender, covered with a hairy down, and divided into several branches, round which there are slender leaves about an inch in length, a little denticulated,

culated, or rather beset with small tubercles. They are all of a hoary colour, and of a physical smell, with somewhat of a sweetness; the taste is partly acrid, and partly of an aromatic bitter. On the top of each branch there is a yellow flower, consisting of several tubulous florets, divided at the top into five parts, with imbricated intermediate leaves, and contained in a common scaly cup. The cup of each floret, or embryo, turns into a streaked oblong brown seed, not at all furnished with down. These flowers are larger than those of southernwood, by which it may be distinguished from it, as well as by the whole appearance of the plant. This plant is cultivated in gardens, and may be propagated by planting slips or cuttings during the spring, which should be put into a border of light fresh earth, and watered and shaded in hot dry weather, until they have taken root. It is of little use in medicine, except in fomentations.

ABSINTHIUM VULGARE, *common Wormwood*, has a lignous and fibrous root, with stalks of an indeterminate height, branched out into many small shoots, with hoary leaves of a bitter taste, and furnished with spikes of naked flowers, hanging downwards, which are placed in long rows towards the top. They are composed of many tubulous florets, divided into five parts at the top, and are of a yellow colour; they are all contained in a common scaly cup, in each of which there is an embryo, which turns into a naked seed. It differs from other sorts of wormwood, in having larger leaves and more jagged. It is very common in all parts of England by the sides of high roads and in dung-hills. It is planted in gardens for common use, and may be propagated by slips in March and October; or it may be raised from seeds, which may be sown soon after they are ripe. Wormwood has always been looked upon as a valuable medicine, to promote the heat and circulation of the blood, and to recover the oscillation of the fibres while sluggish; by which means the gross humours are attenuated, and brought back into the common road of circulation. It restores the debilitated functions of the viscera, and is an excellent stomachic. It is good in the dropsy, green sickness, cachexies, and agues; which last it has often been known to cure. It also by its great bitterness is of some service against worms, by resolving the mucilaginous humours in which their eggs are contained; however, in all hot diseases and in inflammatory dispositions it is not safe.

ABSINTHIUM MARITIMUM, *Sea Wormwood*, has leaves much smaller than the common; they are hoary on the upper side as well as the lower, and the stalks are also hoary all over. It grows wild about salt marshes and near the sea coasts. The virtues are much the same as those of the former.

ABSINTHIUM ROMANUM, *Roman Wormwood*, differs much in appearance from the former. It has a great number of small and woody roots full of fibres, and the stalks are about a cubit in height, which are round, smooth, greenish, or of a reddish green or purplish colour. They are full of leaves from the top to the bottom, which have much the same appearance as those of southernwood, only they are shorter. The flowers are much like those of common wormwood, but less. It is cultivated in gardens, and may be easily raised by the planting and cutting of slips in the spring or autumn. The roots of this plant creep so much, that they will soon spread over a large piece of ground. It is not so bitter as the common wormwood, but is more aromatic; for which reason it is more agreeable to the taste. It has the same virtues as the common wormwood, but weaker.

ACANTHUS, BRANK-URSINE, has a thick fleshy root, black without, and white within, from

whence proceed great numbers of fibres. The leaves that lie on the ground are a cubit in length; and a span in breadth; but the stalks rise to two cubits high, are strong, and adorned with a long row of flowers elegantly disposed like a thyrsis. The leaves are somewhat like those of a thistle, and after them the Romans adorned the capitals of the Corinthian order of columns; that is, with the shape of these leaves; they were likewise imitated by embroiderers, in the time of Virgil. The flowers are labiated, and are of a sort of a flesh colour; the under lip of the flower is divided into three segments, which at the beginning is curled up in the form of a short tube. There is no upper lip, but in its place there are stamina that support the pointals, and the cup of the flower is composed of prickly leaves; the upper part of which is bent over like an arch, and supplies the defect of the upper lip of the flower. The pistil arises from the hinder part of the flower, and turns to a fruit in the shape of an acorn, which is divided into two cells, each containing a single smooth seed. The whole plant is full of a glutinous and mucilaginous juice. It grows spontaneously in Sicily and Italy; but is here cultivated in gardens, and is easily propagated by parting the roots in February or March, or by sowing the seeds at that time. It is seldom used in medicine.

ACETOSA, *common Sorrel*, has a long, fibrous, yellowish, bitter root, and leaves placed alternately on the stalk, in the shape of a spade. The stalk is streaked a foot in length, and is divided into several branches. The impalement of the flower is composed of three small leaves that are bended back, and the flower has three leaves, which are larger than those of the impalement. In the center of the flower is a three cornered pointal, or pistil, supporting three small styles, which are attended with six stamina. It afterwards becomes a triangular seed, inclosed by the petals of the flower; in short, it agrees with the dock in all its characters, except in having an acid taste. It is but a small plant in the fields, but in the gardens it produces large leaves. It must be sown early in the spring, in a shady moist border; and if it be afterwards planted out into another shady border, it will produce still larger leaves, and continue longer. The medicinal virtues are to cool and quench thirst, and their decoction makes a useful drink in fevers. It is also an excellent antiscorbutic.

ACETOSA ROTUNDIFOLIA, *round leaved or French Sorrel*, has the same characters as the former excepting the leaves, which are now and then almost round. This is the best sort for the kitchen use, for which reason it is often planted in gardens. The roots are very apt to spread, by which means it is easily propagated, and must be planted at larger distances, that is, a foot square at least. It is a cooler like the former, and quenches thirst as well as excites an appetite.

ADIANTHUM VERUM, *the true or French Maiden-hair*, is a capillary plant, and has a fleshy fibrous root, from whence arise slender, black, shining, branched pedicles, above a palm in height, which sustain leaves placed alternately, that are about a quarter of an inch broad, and somewhat shorter; they are green, crested, smooth, and streaked as it were with rays, and are like those of coriander. It seems to be without seeds; however, in September, certain notches appear in the leaves, which adhere to each other, and contain a fruit or round membranaceous capsula, which is very small and surrounded with an elastick ring, which by its contraction opens the capsula, which then emits a seed like dust, that is too small to be examined by the naked eye. It grows spontaneously in the northern parts of France, and continues green all the year. This herb was formerly celebrated for its pectoral virtues,

virtues, but is now greatly neglected. A syrup is made of this herb, which is sold in the coffee-houses, and called *Capilaire*; but it is generally supposed to be counterfeit.

AGNUS CASTUS, *the Chaste-tree*, is a shrub full of branches, so tough that they are not easily to be broken. The leaves are joined to a pedicle an inch or two long, and divided into five particular leaves, of an oblong shape, and sharp at both ends. The flowers grow in spikes, and are of a purple, or purple and white colour. They consist of one leaf, which looks as if it had two lips, and the fore part is tubulous. From each calyx arises a pointal, or pistil, which is fixed on the back part of the flower like a nail, and afterwards turns to an almost spherical fruit like pepper, divided into four cells, containing oblong seeds. It is cultivated in gardens, is very hardy, and may be propagated by planting the cuttings early in the spring, before they shoot. They require a fresh light soil, and must be frequently watered till they have taken root. They will grow to eight or ten feet high, and flower in autumn; the flowers grow in spikes at the extremity of every strong shoot. This shrub is acknowledged to be good in hysterical complaints, and in hypochondriacal spasms, especially if they proceed from gross viscid humours. The seed, in powder, is given from half a drachm to a drachm, or in an emulsion.

AGRIMONIA, *Agrimony*, has a blackish, thick, fibrous root, and a hairy branched stalk, two cubits high, with leaves above a palm in length, alternately placed, which are rough, hairy, pennated and grow alternately on the branches. The calyx, or flower-cup, consists of one leaf, which is divided into five segments, and the flowers, which have five or six leaves, form a long spike, which expand in the form of a rose, and are of a yellow colour. The fruit is oblong, dry, and prickly like a burdock, and in each there are two kernels. It is common in the hedges in many parts of England, and is noted for its astringent quality. It is said to be good in the cachexy, dropsy, jaundice, and in fevers arising from the obstructions of the viscera. It is also good in ulcers of the kidneys. The dose of the dried leaves is a drachm in a proper vehicle.

ALCEA, *Vervein Malloes*, have a woody whitish root, from whence proceed several stalks to the height of a cubit, which are round, full of pith, and thinly beset with longish hair. The leaves that proceed from the root and lower part of the stalks are roundish, with incisures on the edges; but those that grow near the top, and placed alternately, are remarkably jagged, and of a blackish green colour and hairy, particularly on the lower part. The flowers are like those of mallows, and of a purplish flesh colour, though they are sometimes white; they are succeeded by seeds, which are black when ripe, are shaped like those of mallows, and have the same faculties as that plant.

ALCHIMILLA, *Ladies Mantle*, has a root as thick as one's little finger, and is fibrous and black; from whence arise long pedicles, a palm and a half in length, which are hairy, and each sustain a single leaf, nearly like that of mallows, but more hard and crisp, and divided into eight or nine acute angles. The cup of the flower is divided into eight segments, which are expanded in the form of a star; the flowers are collected into bunches on the top of the stalk, which consist of several stamina with yellowish heads. The calyx becomes a capsula, containing generally two little round yellow seeds. It delights in mountainous places, such as the Alps and Pyrenees. It also grows wild in some parts of England. This plant is seldom made use of in medicine.

ALKEKENGI, *the Winter Cherry*, has a genicu-

lated root beset with small fibres, from whence arise reddish hairy branched stalks, a cubit in height, from the knots of which arise two leaves with long pedicles. The leaves are like those of garden nightshade, and the flowers consist of one leaf, expanded at the top, and of a whitish colour, but of a pentagonal figure. The fruit, which is about the size of a cherry, is inclosed in the flower cup, and swells over it in the form of a bladder. The fruit is only in use, and is good to promote urine, as well as to cleanse the kidneys and bladder. From three to eight of these cherries may be taken as a dose, and are said to have had a very good effect in preventing the gout, when eight of them were taken every change of the moon. It is very common in English gardens, and the fruit, which is ripe in October, often continues till the beginning of December. It is of the size of a common cherry, and of a fine red colour; the bladder that incloses it is of a deep red, which bursts when ripe, and exposes the fruit to sight. It may be propagated by sowing the seeds in the spring, or by the roots, which creep very much, so as to overspread a large tract of ground; and therefore they should be placed in pots, and set in a shady place in summer. If well watered in dry weather, it produces great numbers of cherries.

ALLIUM, *Garlick*, has a bulbous root, consisting of several membranes, and is of a whitish colour, with a purplish cast. The leaves are oblong, and not fistulous as in onions, but like grass, and the flowers consist of six whitish leaves, with a pistil in the middle, which turns into a roundish fruit of the size of a pea, and of a purplish colour without, but the pulp within is whitish. It is divided into three cells, full of roundish and blackish seeds. Garlick is proper to warm and stimulate the solids, and to dissolve the gross clammy fluids, whence it is good in cold constitutions, and in moist asthmas, as well as all defluxions on the breast. It has been found very serviceable in the dropsy, for it will sometimes cure it without any other medicine. It may be given alone, in a decoction, or made into a syrup; but it must be avoided in all inflammatory dispositions and hot diseases. It may be easily propagated in gardens, by planting the cloves, or small bulbs, in August or September, about four or five inches from each other. In the middle of June the leaves should be tied in knots, to prevent their running to seed, and then the bulb will be greatly enlarged. Towards the end of July, the leaves will begin to wither, and then the root should be taken out of the ground, and hanged up in a dry room.

ALNUS, *the Alder-tree*, is strait and upright, and of a moderate thickness, with a rough, brittle, blackish bark. The wood is reddish, soft, light, easily worked, and the boughs are very brittle. The leaves resemble those of the hazle, and the male flowers, or catkins, are produced at remote distances from the fruit, which is scaly, conical, and of the size of a hazle-nut. The bark, catkins, and fruit, are astringent, and the decoction has been prescribed in inflammations of the tonsils, as a gargle. Some recommend the bark in intermitting fevers.

ALTHÆA, *Marsh-mallows*, has a great number of white roots, about as thick as a finger, which all proceed from one head. The stalks are a cubit or two in height, and are slender, round, villous, and beset with leaves alternately, which are roundish, but sharp at the end, hoary, and beset with a soft down; they are about three inches long, and are sinuous and ferrated. The flowers come out between the pedicles of the leaves and the stalk, and are of a pale reddish colour. They are monopetalous, but divided into five segments, almost to the center, in which is a pyramidal tubulou style, loaded with stamina; and in the cavity there is a pistil, which

turns

turns into a round flat fruit, consisting of several capfula, disposed like a ring about the cake in the middle. Marsh-mallows is very much in use to abate the acrimony of the urine; in disorders of the lungs, to thicken a sharp salt defluxion; and consequently is good in hoarsenesses, coughs, catarrhs, and the asthma. It is likewise good in erosions of the intestines, its decoction being drank, or given in clisters. It is also good for softening hard tumours, and easing pain. The leaves are much preferable to the roots. Syrup of marsh-mallows is a medicine commonly known, and is often prescribed to render the urinary passages slippery to those who are troubled with the gravel.

AMYGDALUS, *the Almond-tree*, has strong branched roots, with a rough trunk, and leaves like those of the peach tree, which are sharp at the ends, and crenated on the edges. The flowers are rosaceous, consisting of five petals, of a whitish, or light purplish colour; the calyx is single, but divided into five segments, with a pistil that turns to a fruit an inch in length, which is long and flat. The outer coat is thin and pretty dry when ripe, under which is a shell that is not so rugged as that of the peach. As for the almonds themselves, they are too well known to need a description. When they are bruised, they yield a large quantity of limpid oil, and when made into an emulsion with water, have a sweet pleasant taste, but if it be kept long it will turn sour like milk. Sweet almonds, when fresh, are nourishing, but they should be well chewed before they are swallowed. In all medicinal uses they should be blanched, that is, the outer skin should be taken off. The emulsion of sweet almonds is prescribed in burning fevers, too great watchfulness, heat of urine, and inflammations of the kidneys and bladder, as well as in all cases where the acrimony of the humours is to be corrected. It is given from one to four, and in some cases to eight ounces, and should be repeated every third or fourth hour. When children are griped, it should be given by spoonfuls, mixed with syrup of marsh mallows.

AMYGDALUS AMARA, *the bitter Almond tree*, agrees with the former in all respects, except the bitterness of the fruit. They have been found to be poisonous when given to dogs and some other animals, but they may be eaten by men without any damage. The oil that is expressed from bitter almonds differs in little or nothing from the former, and may be used in the same cases; as also for softening the wax in the ears, when put therein with a bit of cotton wool. Almond trees are chiefly valued for the beauty of their flowers, which are produced early in the spring, and make a fine appearance. They are propagated by inoculating one of their buds into a plum, almond, or peach stock, the latter end of July. The best season for transplanting these trees into a dry ground, is when the leaves begin to decay; but for a wet soil, in February.

ANAGALLIS MAS, *male Pimpernel*, has a white single root, with a few fibres, and the stalks are so weak that they lie upon the ground; they are of the length of a palm, are square and smooth, and the leaves are placed by pairs, and sometimes three at a time opposite to each other; but they have no pedicles. The lower surface is spotted with blackish red spots; and the flower consists of one leaf, shaped like a wheel, and divided into five sharp segments, which are of a purplish red, with purple stamina, on which are yellow heads. The flower cup is also divided into five parts, from which a pistil arises, fixed in the middle of the flower like a nail, and turns to a fruit, or globous shell, which when ripe opens transversely into two parts, one of which lies upon the other, and incloses many angular wrinkled seeds. This is one of those called the sleeping

plants, whose flowers open about eight o'clock in the morning, and never close till past noon.

ANAGALLIS FOEMINA, *female Pimpernel*, differs only from the former in the colour of the flower, which is blue, and being common in our corn fields; but this is more scarce. The male pimpernel is used as a salad and a pot-herb in many parts of England.

ANETHUM, *Dill*, has a slender white fibrous root, with a branched stalk, a cubit and a half in length; the leaves are like those of fennel, but less, and of a bluish colour, with a strong smell. The flowers are placed at the top of the stalks in umbels, and are rosaceous, consisting of five yellow petals, whose calyx or flower cup is changed into two palish yellow seeds, which are oval, flat, streaked, and have a foliaceous border. It is propagated from the seeds, which should be sown in autumn, soon after they are ripe, and thrive best in a light soil, where they are to remain, for they will not bear a removal. The seeds are only in use, and they have been commended in the flatulent cholic, and against wind. The essential oil is a carminative, and is given from two to four drops on a lump of sugar.

ANISUM VULGARE, *Anise*, has a slender annual fibrous white root, with pleasant green leaves, above an inch in length, which are divided into three parts, or particular leaves, which are smooth and crenated. On the upper part there are many divisions, and the stalk is ramous, streaked, hollow, and sustains flowers disposed in an umbel, which are small, rosaceous, and consist of five cloven white petals, with the flower cup, that turns into an oblong turbinated fruit, in which are two small gibbous streaked seeds, of a greenish ash colour. The taste and smell are sweet and very agreeable. The seed is only in use, which contains a great deal of essential oil. It is numbered among the four hot seeds, and is recommended for the helping of digestion, in the wind, cholic, and in shortness of breath. It is good for gripes in children, and to increase milk in the breasts of nurses. The dose, in powder, is from a scruple to a drachm, and that of the essential oil, from two drops to twenty.

ANONIS *five* ONONIS, *Rest Harrow*, has roots above a foot long, which creep every way, and are not easily broken. The stalks lie on the ground, and are slender, tough, reddish, hairy, and full of prickles; they are beset with leaves, placed three together alternately, and are roundish, slightly crenated, hairy, of a dark green colour, and glutinous to the touch. The flowers are papilionaceous, of a light purple, or flesh colour, and grow in spikes at the top of the branches. The pistil is near a quarter of an inch long, and consists of one bivalved flat capfula, containing a single seed in the shape of a kidney. It is said to open obstructions of the liver, and to cure the jaundice; but it is now out of use.

APARINE, *Goose-grass*, or *Clivers*, has a slender fibrous root, with slender, quadrangular, geniculated, rough, climbing stalks, three or four cubits long. At every genicula, or knee, there are from five to seven leaves placed like a star, which are narrow, rough and terminate in prickles. The flowers proceed from the knees towards the top, and are very small, white, monopetalous, in the shape of bells, and divided into four segments, as well as the flower cup, which turns into a dry, hard, cartilaginous fruit, covered with a thin blackish skin, and consist of two globes full of umbilicated seeds. It is met with almost every where in hedges. It is inciding and aperient, and not only promotes urine but sweat. Two ounces of the juice have been found to be very serviceable in the dropsy, carrying off the water by urine.

APIUM PALUSTRE, *Smallage*, has a thick, whitish stait root, descending deep into the ground, and is sometimes deeply divided into different heads; it has an acrid, bitter, disagreeable taste, with a strong aromatic smell; from the root proceed many leaves standing upon long pedicles; they are reddish, streaked, concave, and are divided into wings, or grow upon a branched rib; they are also cut into five segments, and are smooth, neat, juicy, and of a pleasant green; when rubbed with the fingers they have a strong smell, and the taste is not very disagreeable. The flowers proceed from the joining of the pedicles to the stalk, as well as the top, where they are collected into an umbel, and are small, rosaceous, and consist of five white petals; the calyx turns to a fruit, containing two very small seeds, which are streaked, ash coloured, depressed on one side, and gibbous on the other. It delights in moist marshy places, and is by some transplanted into gardens. The seeds are reckoned among the four lesser hot seeds.

AQUILEGIA, *Columbines*, has a white root an inch thick, which is branched and fibrous, and of a sweetish taste. It has leaves like meadow rue, they being cut on the edges, and are bluish underneath, but above of a dark green, with a bluish cast. The flowers are pendulous, and consist of many petals unlike each other; from the middle of the flower arises the pistil, beset with stamina, which turns to a membranous fruit, consisting of many husks, or pods, each of which is full of black shining seeds. The colours of the flowers are various, as blue, red, white, flesh coloured, and green, upon which account it is cultivated in gardens, and they flower in May and June. For raising them, the seeds should be sown in a nursery-bed in September, and in March following the young plants will appear above ground, which should be transplanted in the middle of May into good fresh earth, and set at nine inches distant every way. At Michaelmas they may be removed into the borders of a flower garden, and the May following they will produce flowers. It has been looked upon as an aperient and sudorific; but it is now out of use.

ARGENTINA, *Silver Weed*, or *Wild Tansey*, has a blackish root, which is sometimes single and sometimes fibrous; the leaves are conjugated like agri-mony, and they are deeply dentated on the edges; they have several small leaves set between them, and the upper part is of an herbaceous green; but the under like that of silver, they being covered with a soft down. The flowers are placed singly on long hairy pedicles, and consist of five petals of a gold colour, with a calyx divided into five sharp parts, between which are many small ones; and there are many stamina of the same colour, with heads thereon. The pistil changes into a spherical head, a quarter of an inch in diameter, full of seeds of a yellowish colour, and like those of poppies. Many physicians have a great opinion of this herb; for Boerhaave affirms it has the same virtues as the Peruvian bark. The dose of the juice is from four ounces to six, and of the seeds to half a drachm.

ARMENIACA MALUS, *the Apricot-tree*, has roundish acuminate leaves, serrated on the edges, and four or five of them are placed together. The flowers, that come out early in the spring, before the leaves, are rosaceous, consisting of five whitish petals, disposed in a ring, with a calyx divided into five segments, from which a pistil arises that turns to a fleshy succulent fruit, very well known. There are seven sorts cultivated in the English gardens, which are, I. *The Masculine Apricot*, which is the soonest ripe of all, and has a small roundish fruit, of a red colour towards the sun, which as it ripens fades to a greenish yellow on the other side. It is only valuable for being soonest ripe, for it has little flavour. II. *The*

Orange Apricot, which is the next that becomes ripe, and is of a deep yellow. The flesh is dry, and is better for tarts than for eating. III. *The Alger Apricot* ripens next, and is of an oval shape, only a little compressed on the sides. It turns to a pale yellow or straw colour when the flesh is dry, with a faintish taste. IV. *The Roman* is next, and is larger than the *Alger*, but not compressed on the sides; the colour is deeper, and the flesh is moister. V. *The Turkey Apricot* is the next in order, because it ripens later than the former, and is bigger than any of them, and has a globular shape. It is of a deeper colour, has a firmer flesh, and a better taste. VI. *The Breda Apricot* was brought originally from Africa, and is a large roundish fruit, turning to a deep yellow when ripe, and is of a deep orange colour on the inside. The flesh is soft, full of juice, and better tasted than any of the whole tribe. VII. *The Brussels Apricot* is the latest, it not being ripe till near the middle of August, unless exposed to a south sun; however too much heat spoils the taste. It is red on the side next the sun, with many dark spots, and of a greenish yellow on the other side; the flesh is firm and of a high flavour, but it often cracks before it is ripe. The best standard trees are those that are about two feet and a half, or three feet in the stem; but they may be planted as dwarfs against an espalier, where, with good management, they will produce a large quantity of fruit. These fruits are all propagated by budding them on plumb stalks; and they are all, except the two last, planted against the walls, which should be either east or west. The borders under these walls should be six feet wide at least, and if the earth be two feet deep, or two and a half at most, it is enough. The soil should be fresh earth from a pasture ground, taken about ten inches deep with the turf, and laid to mellow at least twelve months before it is used, often turning it. The trees that are budded should be but of one year's growth, and if the soil is dry, October is the best month for planting. At Michaelmas, or soon after, when the trees have grown, you must unnailed the branches and shorten them, in proportion to their strength; for a vigorous branch may be left eight or nine inches long; but a weak one only five or six. When they are shortened they should be nailed as horizontally as possible.

With regard to the medicinal uses of apricots, there is little to be said, only that they agree best with persons of hot constitutions; for in weak stomachs they readily corrupt, and then produce feverish disorders, which however are easily cured with emetics and purges.

ARTEMISIA, *Mug-wort*, has a creeping fibrous root, about as thick as one's finger, with a sweet aromatic taste. The stalks grow to two cubits in height or upwards, and are round, streaked, strong, stiff, generally of a purple colour, and covered with short hair; they have also pith in the middle, and are branched, with leaves thereon, placed alternately, that are not unlike those of wormwood; they are of a dark green above, and hoary underneath, by which they may be distinguished from wormwood. The flowers grow on the top of the branches like spikes, consist of many florets of a purplish colour, and divided into five parts, which are comprehended in a scaly cup. Among the florets there are naked embryos, which turn into a double capillament, which afterwards, as well as the embryos of the florets, turn into seeds like those of wormwood, but have not so strong a smell. It is generally accounted anti-hysterical, and is very often in use among the women for female disorders. In some parts of the kingdom it is used as a pot-herb. The dose of the dried herb is three drachms, drank in wine, and is said to be a good remedy against the hip-gout.

ARUM, *Cuckoo Pint*, or *Wake Robin*, has a tuber-

rose fleshy root, as thick as one's thumb, but roundish, white, and full of a milky juice; the leaves are about eight inches long, a little triangular, and somewhat in the shape of the head of an arrow. The stalk rises to a cubit in height, and is round, streaked, sustaining a membranaceous flower like an ass's ear, contained in a sheath of a whitish green, in which is a pistil of a palish yellow, from which proceed berries, that are almost globous, and disposed into an oblong head; they are of a reddish purple, soft, full of juice, and contain a seed or two, that are hard, small, and roundish. The whole plant has a most acrid taste that burns the tongue. The root is only in use, and when tasted bites the tongue so much, that it may be felt a whole day. It has many virtues, but is good in ferous disorders, the cachexy, the green sickness, agues, the dropsy, the jaundice, and is excellent in all diseases that proceed from clammy humours, as well as for opening the obstructions of the viscera. It is also good in a moist viscid catarrhal cough, and to restore the tone of the stomach. It has this peculiarity, that it will cause those to sweat who can hardly be brought to it any other way, when taken to the quantity of a drachm in any good spirit; but if it be dried and taken in powder, then this medicine will fail. The best way of giving it is by beating the fresh root with gummy resins, and making the mass into pills. Outwardly it is very proper to cleanse ulcers, particularly those that are fistulous. The common dose is from half a drachm to four scruples.

ASARUM, *Asarabacca*, is an ever-green herb, which has a slender, angular, knotty, fibrous, ash coloured root, with a bitterish, nauseous, aromatic taste, somewhat like garden valerian; the leaves are round, stiff, shining, of a dark greenish colour, and are sustained by long pedicles; they are somewhat in the shape of an ear, for which reason they are called in French, *Oreille d'homme*, that is, man's ear. The flowers are hid in the leaves near the root, and are of a purple colour, which are scarcely perceivable, except the flower-cup, which is divided into three or four segments, and of a blackish purple colour. The fruit is divided into six cells, full of oblong seeds, that look like the stones of grapes. It delights in woody places, and is found wild in some parts of England, though but seldom. The flowers appear in April; but grow so close to the ground as not to be seen, unless you put away the leaves with your hand. It is best raised by slips. The leaves are a strong vomit, as well as the roots, working both upwards and downwards; but the leaves are chiefly in use, to make a sneezing powder, and are said to be the principal ingredient in Major's Patent Snuff.

ASCLEPIAS, *five* VINCETOXICUM, *Swallow-wort*, or *Tame Poison*, has a root full of fibres, which proceed from a single head, and has an acrid, bitterish, disagreeable taste, with a nauseous smell; the stalks are tough, hairy, and geniculated, and rise to a cubit in height; the leaves are placed by pairs over against each other, and are a little hairy on the hedges; they are in the shape of the leaves of ivy, but are longer, more wrinkled, and have very short pedicles. From the joints of these pedicles, with the stalk, proceed whitish monopetalous flowers, in the shape of a bell, and are divided into five parts, expanded in the form of a star, with five apices of the same colour, and a cup divided into the same number of parts, with a pistil fixed in the hinder part of the flower, like a nail, that turns to a fruit composed of two membranaceous husks that open from the bottom to the top, inclosing many seeds, that are covered with fine down, and are fixed to the membrane like scales on the skins of fishes. It has no milky juice like dog's-bane, by

which it may be distinguished from it. It is propagated by parting the roots, either in spring or autumn, which will grow almost in any soil. It has been cried up as an antidote against poison, but is now neglected for that purpose. It is much more proper for acute, than chronic diseases; because it is a gentle resolvent, and promotes both sweat and urine.

ASPARAGUS, *Asparagus*, corruptly called *Sparrow grass*, has a great number of roots, proceeding from a single head, that are round, fleshy, whitish, sweetish, and clammy. Early in the spring they emit tender, long, round, green shoots, without leaves, that are so well known they need no description. When they are grown up they arise to the height of two cubits, and are divided into slender strong branches, with green, capillaceous, soft leaves, an inch in length. The flowers are rosaceous, with six petals of a pale green colour, and a pistil that turns to a soft berry of the size of a pea, that is globous, purplish, soft, sweetish, and contains two or three umbilicated black seeds. It is cultivated in gardens for the use of the kitchen. *Asparagus* provokes the appetite, but yields little nourishment, and gives the urine a particular strong smell. It has little or no medicinal virtues.

ATRIPLEX FOETIDA, *Stinking Orach*, or *Arach*, has a slender fibrous root, from whence generally proceed branched stalks, about nine inches in length, with roundish small leaves, terminating in a point, and are covered over with a mealy whitish powder. The flowers grow on the top of the stalks, and are without petals; for they consist of many stamina, arising from a calyx divided into five parts, with a pistil that turns into a single, small shining, blackish, and roundish flat seed in a capsula, in the form of a star. It grows in uncultivated places, and near the sides of roads. It is antihysterick, and the infusion of the leaves taken hot is an excellent medicine against the hysterick passion.

AGRANTIA MALUS, the *Orange-tree*, is not very tall, but has a thick, woody, branched root, which spreads very much, and is of a yellow colour on the inside. The trunk is hard, whitish within, has an agreeable smell, and is covered with a greenish, smooth, white bark. The branches are numerous, flexible, and of a beautiful green, with a few thorns thereon. The leaves are somewhat like broad leaved laurel, and are always green, thick, smooth, broad, and ending at each end in a point, with a foliated pedicle in the shape of a heart. When held up to the light there appears to be a sort of holes in them like St. John's wort. The flowers grow in bunches, and are rosaceous, consisting of five white petals placed in a ring, with many stamina, which have yellow apices, or heads; at the bottom and center of the cup there is an orbicular placenta, which sustains a roundish pistil with a long tube, that runs into a globous fruit, covered with a rind, which is very well known. There are several kinds of Oranges, as the common *Seville Orange*, the *sweet Seville Orange*, the *China Orange*, the *curled leaved Orange*, the *striped curled leaved Orange*, the *horned Orange*, the common *striped Orange*, the *Hermaphrodite Orange*, the *willow leaved Orange*, commonly called the *Turkey Orange*, the *striped Turkey Orange*, the *Purple Nose*, or *Shaddock Orange*, the *double flowered Orange*, the common *Dwarf*, or *nutmeg Orange*, the *dwarf striped Orange*, the *dwarf China Orange*, the *childing Orange*, the *distorted Orange*, the *large warted Orange*, the *starry Orange*, and the *Orange with a sweet rind*. Many sorts of these oranges are cultivated in England, though more for curiosity than the fruit they produce; and of late years some of them have been planted against walls, with frames of glass to cover them in the winter. Some curious persons have likewise planted them in the

the open ground, and have had covers for them, which have been taken away in the summer; by this means the fruit has ripened so well as to be extremely good for eating. However, in hard winters it is very difficult to preserve them.

Orange peel is an excellent bitter, especially that of Seville oranges, which strengthens the stomach, helps digestion, attenuates gross humours, discusses wind, and eases cholic pains proceeding therefrom. It is an ingredient in tinctures, called stomachic bitters, and is now common in taverns, where they mix it with a glass of wine, and drink it before dinner to create an appetite. The essential oil distilled from the rind is also proper for the same uses, when two or three drops are taken upon sugar, as well as the peel, when it is candied. The pulp of sweet oranges is cooling, quenches thirst, and excites the appetite; but the juice of sour oranges not only serves to make a cooling drink in hot weather, but is of late found to be excellent against the scurvy.

BARDANA, *Burdock*, has a thick, single, strait root, a foot in length, blackish on the outside, white within, and of a sweetish subaustere taste. The leaves are large, being a foot long and upwards; they are sharpest at the points, hairy, and of a dark green colour, but hairy underneath. The flowers consist of many purple florets, deeply cut into five segments, resting on the embryo, which is contained in a cup made of many scales, that terminate in hooks, and bend inward. The embryo turns into an oblong, flat, streaked, flattish seed, with short down or rather tufts of hair. It is to be met with every where by the way sides. The root is diuretic, sudorific, pectoral, uterine, vulnerary, and febrifuge. It has been of late greatly recommended in the gout. It is given to a drachm in powder, and to an ounce in decoction. The seeds of burdock are of a bitter subacid taste, and are a powerful diuretic, when a drachm of them is taken in white wine, or any other proper vehicle.

BECCABUNGA, *Brook-lime*, has fibrous, white, creeping roots, with upright stalks, that are round, spongy, reddish, and branched. The leaves are roundish, smooth, thick, crenated, of a dark green colour, and above an inch in length. The flowers proceed from the places where they join to the leaves, and are placed on spikes, a palm, or a palm and a half, in length; they are monopetalous, but divided into four segments, and are of a bright blue colour. There are three blue apices, and a pistil that turns into a membranaceous flat fruit, of the shape of a heart, and a quarter of an inch long. It is divided into two cells, containing many small flat seeds. This herb has no remarkable taste, and yet some prefer it to other more acrid antiscorbutics. The dose of the juice is four ounces; but it is best mixed with the juice of oranges, and then it may have a very good effect in hot scurvy.

BELLA DONNA, *Deadly Night-Shade*, has a thick, long, juicy, whitish root, divided into several branches; the stalks are two cubits high, and are round, as thick as one's thumb, branched, hairy, and of a reddish black. The leaves are like those of garden night-shade, which are twice or thrice as large, and are soft and somewhat hairy. From the place where the leaves join to the stalks the flowers proceed, which are monopetalous, in the shape of a bell, divided into five segments, streaked, a little hairy, and of a dark purplish black, with five stamina, and as many whitish apices. From the calyx it is hairy, and divided into five parts; the pistil proceeds, which is fixed into the hinder part of the flower, like a nail, and turns into a soft round fruit, like a grape, of a shining black colour, and full of a vinous juice. It is divided by a partition in the middle into two cells, full of many minute oval seeds. It grows in woods, near walls and hedges, and in

other uncultivated places. The fruit, or berries, have often proved of dangerous consequence to children who have eat them. They produce a delirium, laughter, various gesticulations, and at last madness.

BELLIS MAJOR, *the greater, or Ox-eye Daisy*, has a fibrous creeping root, with stalks two cubits high, that are erect, of a pentagon shape, villous, and branched, with flat leaves placed alternately, two inches long, half an inch broad, and crenated. The flowers are large, radiated, and their disk consists of many gold coloured florets, divided into five segments, with a style in the middle of each; but the crown is composed of white semi-florets, resting upon embryos, and placed in a hemispherical scaly blackish cup. The embryos at length turn into slender, oblong, streaked, naked seeds. The heads, after the petals are fallen off, resemble obtuse combs.

BELLIS MINOR, *the common Daisy*, has many small roots, with a great number of leaves lying on the ground, that are flat, hairy, long, and narrow towards the root, sensibly increasing to the end, where they are roundish, and they are slightly serrated. It has no stalk, but there are many pedicles between the leaves, a palm or upwards in length, which are slender, round, hairy, and on the top of each there is a flower, whose disk is composed of many yellow florets, and the crown of semi-florets, of a white colour with a reddish cast. The embryos are placed in a single cup divided into many parts. The embryos afterwards turn to small naked seeds: it is every where common in meadow or pasture lands. Besides these there are the *small striped Daisy*, the *red garden Daisy*, with double flowers, the *white double garden Daisy*, the *double striped garden Daisy*, the *hen and chicken Daisy*, the *white cock's comb Daisy*, and the *red cock's-comb Daisy*. The garden Daisies are propagated by parting the roots in autumn, and should be planted in gardens of strong earth, and be exposed to the east, for the great heats of summer will sometimes kill them. The leaves of the ox-eye daisy gathered before the flowers appear, yield a decoction of an acrid taste, not much unlike pepper. It is commended in purulent spitting. The lesser daisy has been generally accounted good for internal wounds, and for dissolving and discussing grumous blood.

BERBERIS, *the Barberry-tree*, is a tall shrub, having fibrous, yellowish, creeping roots, and the branches are beset with sharp thorns. The leaves are small, oblong, narrow at the bottom, but broader towards the top, are crenated on the edges, and beset with short thorns. They are smooth, green, and have an acrid taste. The flowers consist of six leaves, that expand in the form of a rose, consisting of six petals of a yellow colour, with as many stamina, and a greenish pistil, turning into a cylindrick red soft fruit, one third of an inch in length, and full of an acrid juice, containing one or two oblong kernels. The fruit grows in clusters hanging down, and the bark of the tree is whitish. The best method of planting them is to place them eight or ten feet asunder, keeping their middles thin and free from dead wood. The branches should seldom be shortened, but when it is done it must be at Michaelmas, when the leaves begin to decay. The fruit is cooling and astringent, and proper to strengthen the stomach and intestines, as well as to excite the appetite. The dose of the expressed fruit is an ounce, though they are eaten commonly when ripe. The juice, or decoction, abates the inflammation of the fauces and tonsils, and heals loose rotten gums. Dyers make use of the bark for colouring yellow.

BERULA, *five SIUM*, *Water Parsnip*, has geniculated, creeping, white, fibrous roots, from whence proceed stalks above a cubit in height, which are

hollow, round, strait, branched; and have many leaves that are set thereon by pairs, with a single leaf at the end; they are fat, smooth, and cut all round the edges like a saw. The flowers are disposed in umbels, and placed at the end of the stalk; they are rosaceous, and consist of five white petals placed in a ring. The flower cup turns to a roundish fruit, containing two small streaked and gibbous seeds. It delights in being in and near rivulets and ditches. It is accounted an antiscorbutic and aperient, and is thought to open obstructions. Three ounces of the juice is a dose; however, it is seldom used in physic, but in some countries is eaten as a salad.

BETA, *white and red Beets*. The *white Beet* has a round, woody, long, white root, about as thick as one's little finger, with large, broad, smooth, thick, succulent leaves, sometimes of a pale, and sometimes of a deeper green, with a thick broad rib. The stalks are slender, streaked, branched, and two cubits high. The flowers proceed from the hollow between the stalk and the pedicle of the leaf, of which there is a long row; and they have no visible leaves, but consist of many stamina, or threads, which are collected into a globe; the cup of the flower is divided into five segments, which turns into a globous fruit, containing two or three small oblong seeds of a reddish colour.

Red Beet has a white root, and shorter leaves than the former, more or less red, and sometimes of a blackish red. This is distinguished from the former by the number of the leaves.

The *Turnip rooted red Beet* has a higher stalk than the common red beet, and the root is two or three inches thick, bellying out; on the outside it is of a deep blood colour. All these beets are cultivated in gardens for the use of the kitchen; but they were in greater esteem formerly than they are at present. However, the red beet is still used to garnish dishes.

BETONICA, *Betony*, has a thick, transverse, fibrous, hairy root, from whence proceed quadrangular knotty stalks, growing to the height of a cubit. Some of the leaves proceed from the knots by pairs, placed over against each other, and others lie on the ground; they are oblong, villous, wrinkled, and of a darkish green colour, and are crenated on the edges. The flowers grow in spikes, and are monopetalous, labiated, and of a purplish colour; the upper lip is sulcated, and as it were reclines backwards; but the lower consists of three lobes, with stamina of the same colour as the former. The flower cup is cut into five segments, from whence proceeds a pistil fixed in the hinder part of the flower, like a nail, with four embryoes, that change to as many roundish seeds, contained in a capsula, that was the cup of the flower. It is common in woods and shady places throughout England. *Betony* is discutient and aperient, and has been always accounted an excellent medicine for the head, and the leaves reduced to powder promote sneezing; for which reason, and for its being a cephalick, it is always an ingredient in the herb snuffs.

BISTORTA, *Bistort*, or *Snake-weed*, has a thick, oblong, geniculated root, in shape like a finger when it is close bent, and has many hairy fibres. It is of a blackish brown without, and of a reddish colour within. The leaves are oblong, broad, and acuminate like those of the dock, but less; they are full of veins, and of a blackish green colour above, but bluish below; the stalks are about a foot in height, and are slender, smooth, round, geniculated, and beset with a few smaller leaves; for the largest grow at the bottom. The flowers grow like a spike at the end of the stalk, and are without petals; for they consist of many stamina, with flesh coloured apices or heads. The cup is divided into five segments, and the pistil turns to a triangular reddish black shining seed, contained in a capsula, that was the

cup of the flower. The root is only in use. It is said to be balsamic, vulnerary, and astringent, and is used in all cases where astringency is proper, particularly in hæmorrhages, spitting of blood, and overflowing of the menses. The decoction of half an ounce to an ounce of the fresh root is a dose, or rather it may be taken at several times; and the powder may be given from half a drachm to a drachm, made into a bolus with conserve of roses.

BONUS HENRICUS, *the English herb Mercury*, has a thick yellowish root, furnished with a few fibres, from whence proceed concave stalks, to the height of a cubit, which are a little hairy; the leaves are triangular, smooth above, but below sprinkled with a sort of meal, and they have long pedicles placed on the stalks alternately. The flowers, that grow in several bunches on the top of the stalks, are small and without petals, but they have several yellow stamina proceeding from the flower cup, which is divided into many segments. The pistil turns into a small seed, in the shape of a kidney, which is black when ripe. It grows in uncultivated places by the way side, and among the ruins of old walls and buildings. It is often used for food in many parts of England, and is reckoned as good as spinage. It is emollient, and has been sometimes used as a cataplasm to appease the pains of the gout, and that without any danger.

BORRAGO, *Burrage*, has a white, thick, fibrous root, and broad, roundish, rough, wrinkled, blackish green leaves, that lie on the ground; but those that are higher are furnished with exceeding small prickles. The stalk is hairy, round, hollow, branched, and grows to the height of a cubit. The flowers, that grow on the top of the branches, are of a fine blue, placed on pedicles, an inch in length, that are crooked and bend downwards. The flowers have only a single petal, which is deeply divided into five segments, sharp at the ends, and placed like a star; the apices in the middle of the flower are sharp pointed, and adhere together in the shape of a pyramid. The flower cup is green, hairy, and divided into five acuminate segments, from which a pistil arises, fixed in the hinder part of the flower, like a nail; and there are four embryoes, that turn into as many seeds in the shape of a viper's head. It is common in all parts of England, and is often found in dunghills and on public roads. The seeds of this plant may be sown in the spring or autumn, soon after they are ripe; it will grow almost in any soil, but that which is dry is best. It is often used in the summer time with balm for making cool tankards, and the flowers are said to be cordial, and to have many other virtues, as well as the herb, that are now disallowed.

BRASSICÆ, *Cabbages*, are of several sorts, as the *common white Cabbage*, the *Russian Cabbage*, the *red Cabbage*, the *flat sided Cabbage*, the *sugar loafed Cabbage*, the *early Battersea Cabbage*, the *white Savoy Cabbage*, the *green Savoy Cabbage*, the *green Broccoli*, the *Italian Broccoli*, the *turnip Cabbage*, *curled Colewort*, the *mist Cabbage*, the *branching tree Cabbage* from the sea coast, *brown Broccoli*, *common Colewort*, the *Cauliflower*, the *Borcole*, *Alpine Colewort*, *perfoliated wild Cabbage*, *white Cabbage with a white flower*, and the *perfoliated wild Cabbage with a purple flower*.

BRASSICA CAPITATA ALBA, the *common white Cabbage*, is very well known, and bears, like all the rest, flowers that consist of four leaves or petals, in the form of a cross, which are of a yellow, or pale yellow colour, placed in a cup divided into four segments, from which arises a pistil that turns into a round, long, slender fruit, or pod, divided by a partition in the middle, and consisting of two cells, full of roundish blackish seeds.

BRASSICA CAPITATA RUBRA, the *red Cabbage*,

bage, has leaves like the common cabbage, but the colour is various, for sometimes they are of a blackish purple, sometimes of a greenish black, and at other times more greenish; but they have all red ribs and nerves.

BRASSICA RUBRA VULGARIS, the *common red Cabbage*, is taller than the former, and has a stalk that grows sometimes to the height of two yards, which is thick, of a blackish purple colour, and watry on the lower part. The leaves are irregularly placed, and are all of a greenish red, with some shades of blue, and wrinkled, with thick veins. The flowers that grow on the top of the stalks are yellow, and change into pods a palm in length, that contain red round seeds. The leaves are not collected into heads as the former, but continue expanded and open. It stands the winter very well, and continues several years. The ends of the branches in the spring are eaten as a sallad.

BRASSICA ALBA CRISPA, the *white Savoy Cabbage*, has round extremely wrinkled leaves, which seem to be divided into cells, and have short pedicles. They are collected into a small whitish head; but their extremities are of a dark green. The flowers and seeds are like the former.

BRASSICA CAULI FLORA, the *Cauliflower*, has large leaves, upwards of half a yard in length, which are sharper than those of the common cabbage, but not so broad; they are of a light green with a bluish cast, and the nerves on the outsides are whitish. The leaves are collected into a head, but not so close as a cabbage, between which there is a heap of thick whitish soft flowers, that are generally in great esteem. When they are not gathered for the kitchen, they arise to a considerable height in time, and turn from flowers to pods like the former. These are all the sorts mentioned by medicinal writers, for the rest are only for the kitchen.

The *common white, red, and long-sided Cabbages*, are chiefly cultivated for winter use, and the seeds must be sown at the end of March in beds of good fresh earth. Towards the end of April, when the young plants have about eight leaves, they should be pricked out into shady borders, about three inches square, to prevent their being long shanked. They should be transplanted in the latter end of May to the place where they are to grow, and should be set in rows, two feet and a half distant. If the season should prove dry when they are transplanted, they must be watered every other evening, till they have taken fresh root. As they advance in height, the earth must be drawn about the stems with a hoe, which will greatly strengthen the plants. Some of these cabbages will be fit for use soon after Michaelmas, and the rest will continue till the beginning of March, if not destroyed by bad weather: to prevent which the gardeners near London pull up their cabbages in November, and trench their ground up in ridges, laying their cabbages against the ridges as close as possible on one side, and bury their stems in the ground. They are suffered to remain in this manner till after Christmas, when they cut them for the market.

The *Battersea, and sugar loaf Cabbages*, are for summer use, and are usually named Michaelmas cabbages. The seeds are to be sown in the beginning of August, in an open spot of ground, and when they have eight leaves they must be pricked into beds at three inches distant every way. Towards the end of October they must be planted out for good, two feet and a half distant from each other, and the rows must be three feet asunder. In the spring the earth must be drawn up about the stem with a hoe, and in May their leaves will begin to cabbage, to promote which they may be tied together with a slender osier twig.

The *Savoy Cabbages* are propagated for winter use;

for a frost is thought to make them better. They must be sown about the middle of April, and cultivated in the same manner as common white cabbage, but somewhat nearer to each other.

The **BRASSICA FIMBRIATA**, that is, the *Boor-cole*, may be treated in the same manner, but need not be planted above a foot square. These are never eaten till the frost has rendered them tender; for otherwise they are tough and bitter. The seeds of the several kinds of broccoli should be sown the latter end of May or beginning of June, and when the plants have eight leaves they should be transplanted into beds, like the common cabbage; and at the end of July they will be fit to plant out for good, which should be in a sheltered spot of ground, but not under trees, and about a foot and a half distant each way. Towards the middle of December they will begin to show their small heads, which are somewhat like a cauliflower, but of a purple colour; and they will continue to be fit to eat till the beginning of April. The brown sort should be sown in April, and be managed like the common cabbage.

The *Turnip cabbage* is not so much cultivated as formerly, though some yet esteem them for soups. The seeds must be sown on a bed of light fresh earth, and when the plants are about an inch high, they should be removed to a shady border, and set at about two inches distant every way, watering them till they have taken root. Near the middle of June they should be transplanted out where they are to remain, and set at two feet distance every way, watering them till they have taken root; the earth should be drawn about them with a hoe, to prevent them from drying, and in the winter they will be fit for use.

The seeds of the curled colewort may be sown in the middle of July, and when they are strong enough for transplanting, they should be set in rows, nine inches asunder, and at five inches distance in the rows, in a moist season. They will be fit for use after Christmas, and continue good till April.

BRYONIA ALBA, *white Bryony*, or *Wild Vine*, has a root sometimes as thick as a man's thigh, is fleshy, and divided into large branches; when it is dried it is spongy, and marked with circles and rays. The taste is acrid, bitterish, and disagreeable, and the smell while fresh is very strong. The stalks are long, slender, streaked, a little hairy, and climbing with tendrils like a vine. The leaves are angular, set alternately on the stalks, and are shaped pretty much like those of a vine, only they are less, and a little rough. The flowers proceed from the hollows where the leaves join to the stalk, and consist of a single petal, which is open in the shape of a bell, and divided into five parts, of a whitish green colour, marked with veins. Some of these flowers are large, and without embryoes; others are less, and contain one embryo, which turns into a spherical berry of the size of a pea; it is at first green, then red and full of a nauseous juice, as well as round seeds, covered with slime. It may be cultivated in gardens by sowing the berries in the spring of the year in a dry poor soil, where they will in two years time grow to be large roots. It grows wild under hedges, and climbs upon the bushes. The juice of the root is so sharp that it eats into the skin; however, when they are dry, they lose a great part of their acrimony; it is a strong cathartic, and we have some notable instances of its killing and bringing away worms; it has been used in madness, and some kinds of dropries with success, as well as in a moist asthma. The dried root reduced to powder, is given from a scruple to a drachm; but the extract made by water is much the best and safest, because it works in a milder manner, and the dose is from half a drachm to a drachm. Externally, it is a powerful resolvent, and has been recommended against pains in the side,

side, the hip-gout, and scrophulous tumours. The fresh root being bruised, and laid to the small of the back, has promoted urine and cured the dropsy; likewise, when it has been grasped in the hand when fresh for some time, it has been known to purge. For the hip-gout it should be bruised, mixed with linseed oil, and laid warm to the part.

BRYONIA NIGRA VULGARIS *feu* **RACEMOSA**, *black Bryony*, has a large, thick, long, tuberose root, black on the outside, but white within, and full of a thick sily juice, with no disagreeable taste. The stalks are like those of the vine, but without tendrils; however, they are slender, long, climbing, woody, and of a dark reddish colour; with soft, green, shining leaves, placed alternately thereon, like those of the great bind-weed. The flowers proceed from the hollows between the leaves and the stalks, and grow in bunches; they consist of a single petal in the shape of a bell, and are divided into six segments of a yellowish green colour, some of which are barren, and others fruitful. These last sort have an embryo, which turns to an oval red berry, or of a brownish red, full of roundish seeds. Its common use is as a resolvent; for it will take off the black and blue marks of the skin arising from bruises, when it is bruised and laid thereto in the form of a cataplasm.

BUGLOSSUM, *garden Bugloss*, has a long round root, about as thick as one's finger, which is reddish or blackish without, but white within, and abounding with a clammy juice. The stalks rise to above a cubit in height, which are round and beset with stiff hairs. The upper part is branched, and has leaves set thereon without pedicles; they are narrow, oblong, of a bluish green, and terminate in a sharp point, but are not wrinkled like burrage. They are hairy on both sides, and their edges are even. The flowers grow at the top of the stalks and branches, and are in the shape of a funnel, consisting only of a single petal. The flower cup is composed of five oblong, narrow, sharp, hairy segments, and the flower consists of the same number, and is of a bluish purple colour. The pistil is oblong, and fixed in the hinder part of the flower like a nail; there are four embryos, which turn to as many seeds in the shape of vipers heads. The tops of the stalks and the cups of the flowers are purple. It is cultivated in gardens. The flowers are in the number of those that are said to be cordial, and are proper to restrain the heat of the blood, as well as to promote its circulation, according to some. The flowers may be used in the same manner as tea.

BUGULA, *Bugle*, or *middle Confound*, has a slender, fibrous, white root, with roundish, soft, sinuated leaves, of a dark greenish colour, and two inches in length. It grows in stony places; the lower part is generally purplish, and the taste at first is sweetish, but afterwards bitterish and astringent. Some of the stalks are slender, roundish, and creep on the ground, while others rise to the height of a palm, and are quadrangular, with hair on two of the opposite sides. The flowers are placed in whirls round the stalks, and consist of a single petal, one of whose lips is divided into three parts, the middlemost of which is split in two. The place of the under lip is supplied by small teeth, with a pistil and blue apices like the flower. The flower cup is short, hairy, and divided into five segments, from whence the pistil rises, and is fixed in the hinder part of the flower like a nail. It is attended with four embryos, that turn to as many roundish seeds shut up in a husk, which before was the flower cup. It delights in meadows and shady places. It is a vulnerary herb, and is good in all cases where mild astringents are proper.

BURSA PASTORIS, *Shepherd's-Pouch*, has a

white, strait, fibrous, slender root, with a stalk that rises to a cubit in height. The lower leaves are sometimes whole, but more generally jagged like dandelion; but those that grow on the stalks are much less broad at the base, with even edges, and terminate in a point. The flowers are placed in rows on the tops of the branches, are small, and in the form of a cross; they consist of four roundish petals with small stamina, bearing yellow apices or heads. The flower cup consists of four leaves, and the pistil turns into a flat fruit in the shape of a heart, or as some fancy like a purse, and is a quarter of an inch long; it is divided into two cells, in which are contained exceeding small seeds. It is said to be a vulnerary, astringent, cooling herb, and is given in all hæmorrhages and fluxes; but some think it is so binding as not to be safe.

BUXUS, the *Box-tree*, is a shrub which seldom grows to any considerable size in England, though it has sometimes been seen as thick as a man's thigh. The largest were found in great plenty upon Box-hill, near Dorking in Surry; but of late they have been pretty much destroyed; however, there are many still remaining, of a considerable bigness. Some have thought that the box wood, made use of by mathematical instrument makers and others, was the product of England; but this is a mistake, for it is brought from the Levant in large blocks. This shrub is an ever-green, and very bushy, having oblong, small, hard, thick, shining leaves, of a disagreeable bitterish smell and taste. The flowers are of two sorts, the barren and the fruitful: the first are without petals, and consist of many stamina, generally proceeding from the bottom of a foliated square flower cup, of a yellowish colour; the fruitful, or rather the fruit, is shaped like a potrage-pot turned upside down, and is divided into three cells of a green colour, containing two seeds, each of which when ripe is thrown out by the elasticity of the vessels; the seeds are brown, long, and shining. These shrubs are a very great ornament to cold and barren soils, where few other things will grow. They may be propagated by planting the cuttings in a shady border, observing to keep them watered till they have taken root. The best season for transplanting these into nurseries is in October; or the seeds may be sown soon after they are ripe in a shady border, which must be duly watered in dry weather; and from these you may expect the largest trees.

There are several sorts of Box-trees, as the *common Box-tree*, the *narrow leaved*, the *striped*, the *gold edged*, the *silver headed*, the *dwarf*, and the *dwarf striped Box*. The dwarf kind is used for bordering flower-beds, for which purpose it is excellent, as it will bear all weathers, and is kept handsome with little trouble. This is easily propagated by parting the roots, which is much better than planting the slips. It is seldom used in medicine.

CALAMINTHA, *common Calamint*, has a fibrous root, with stalks growing to the height of a palm and upwards, which are quadrangular, branched, and have leaves growing by pairs opposite to each other. They are from half an inch to an inch in length, and are roundish, obtusely acuminate, a little serrated and hairy, with an acrid taste, and a disagreeable smell. From the middle to the top, the flowers grow where the pedicle of the leaves join to the stalk in bunches; they are long and tubulous, and open at the top with two lips; the uppermost of which, or crest, is roundish, and divided into two segments; but the lowermost, or beard, is divided into three. They are of a purplish colour, and placed in a hairy streaked calyx, from whence rises a pistil fixed in the hinder part of the flower like a nail, and as it were attended with four embryos, which turn into as many light blackish

blackish seeds, whose calyx was the capsula of the flower.

Calamint (of which there are several sorts, but they differ so little from that already described, as to require no particular description) powerfully incides gross humours, excites the appetite, and discusses wind. It is taken in the manner of tea, and is generally accounted a good hysseric.

CALENDULA, garden *Marygold*, is otherwise called *Caltha Vulgaris*, and has a root divided into many thick fibres or branches; but the stalks are slender, a little angular, hairy, and clammy to the touch. It is divided into many branches, and the leaves are narrower at the base than at the top; they are hairy, and of a light green colour. The flowers grow on the top of the branches, and are of a gold colour and radiated; the disk consists of many tubulous florets, divided into five parts; and the crown is composed of crenated semi-florets, placed upon embryos in a hairy flower cup, divided into many parts. The embryos turn into crooked margined capsulae full of oblong seeds. It is cultivated in gardens, and if the seeds are permitted to scatter, they will multiply greatly, and become as troublesome as weeds. The flowers are said to be aperient and dissolvent, and proper to open obstructions of the liver, spleen, and womb; but they are not very efficacious for these purposes; however, infused in wine, they will open a slight obstruction of the liver.

CAMPHORATA, *sinking ground Pink*, has a long woody root, about the thickness of a man's thumb, with many woody, thickish, branched, hairy, whitish stalks, with small knots placed alternately, from whence proceed a great many leaves, not a third of an inch in length, which are thin, hairy, pretty thick, have an aromatic smell, and when rubbed between the fingers smell pretty much like camphire. The flowers are without petals; for they consist of four stamina, with rose coloured apices, or heads; proceeding from a cup, which is only a single herbaceous leaf, divided into three, and sometimes into five, segments; from whence arises a pistil, that turns into a small, oblong, black, roundish seed, contained in a capsula, which was the calyx of the flower. It promotes urine and sweat, and is good in recent obstructions of the viscera, as well as in the moist dropsy. It may be drank as tea, but is very heating, and therefore must be used cautiously.

CANNABIS SATIVA, *manured Hemp*, has a single, white, woody, fibrous root, with a square hairy stalk, rough to the touch, and hollow within; it grows two yards high, and has a rind that may be divided into threads. The leaves consist of five segments or upwards, which are narrow and divided to the very pedicle; they are oblong, acuminate, serrated, veinous, rough, of a blackish green colour, and of a strong smell. The flowers and fruit do not grow upon the same plant; the former proceed from the places where the leaves join to the stalk, and have no visible petals; they consist of five stamina with yellow apices or heads, placed in a cup composed of five leaves, purplish without, and whitish within. The fruit on other stalks are without flowers; but they have pistils contained in a membranaceous capsula of a yellowish green colour, which turn into a roundish smooth seed, covered with a thin shining shell. The plants of both kinds proceed from the same seeds, which are sown in almost all parts of the world. The use of hemp is every where well known, it being made into ropes, thread, linen, and paper.

Hemp is always sown in a deep, moist, rich soil, such as is found in Holland, in Lincolnshire, and the fens of the Isle of Ely, where it is cultivated to great advantage. The land should be well ploughed and rendered fine by the harrow; the latter end of

April is the best time of sowing the seed, of which the heaviest and brightest coloured is best; when the plants come up, they should be hoed up like turnips, leaving them a foot or sixteen inches asunder; about a month after they should be hoed again, to destroy the leaves. The first season of pulling the hemp is about the latter end of August, and they first begin with the *finble hemp*, which is the male plant; but a fortnight or three weeks longer would be better, that none of the seeds may prove abortive. The second pulling is about the middle of October, when the seeds are ripe, and this is usually called *karl-hemp*, they being the female plants.

Hemp seed is recommended by Sir John Floyer, and others, against the jaundice, for which purpose two ounces may be boiled in a quart of milk till they break; and five or six ounces of this decoction may be taken several times in a day. It is also good in coughs, and heat of urine. The oil expressed from the seeds is recommended by some to ease the pain proceeding from burns.

CAPPARIS, the *Caper-bush*, has a large woody root, from whence proceed various shoots, armed with hard sharp prickles, and on which the leaves are alternately disposed, which are almost round, half an inch broad, and very bitter. The flowers proceed from the hollows where the leaves join to the stalks, and are rosaceous, white, and consist of four petals, from whose middle arises many stamina, with a long pistil; the flower cup consists of four green leaves, and the extreme part turns into a fruit almost in the shape of a pear; they are of the size of a large olive, and contain many small whitish seeds, almost in the shape of a kidney. In Italy it grows wild among the ruins of old walls and buildings; but in other places it is cultivated. There are several sorts of caper-bushes, as the *large fruited Caper without thorns*, the *prickly round leaved Caper with a small fruit*, the *sharp leaved Caper*, the *American tree Caper with a bay leaf*, and a *long fruit*, the *American tree Caper with a bay leaf and an oval fruit*, the *American tree Caper with laurel leaves and an oblong fruit*. In England it is very difficult to preserve these plants, and therefore nothing need to be said about their cultivation. What we call capers are the buds of the flowers before they are opened, which at first are laid in the shade for about four hours, and then put into vinegar for eight days; after which they are taken out, lightly pressed, and put into fresh vinegar for eight days more; this is repeated a third time, and then they are put up into casks for sale. They are every where known as a sauce, and are used to excite a languid appetite. Some put them into a brass vessel to give them a finer green colour, and then they are noxious. It is not used in medicine.

CAPRIFOLIUM, *Woodbind*, or *Honey-suckle*, has a woody creeping root with large fibres; the stalks are divided into branches, and are creeping or climbing, on which the leaves grow by pairs opposite to each other; they are oblong, sharp, soft, of a light green above, and hoary beneath. The flowers grow on the tops of the branches, and in some plants are white, and in others red or yellowish; they have a very sweet smell, and consist of a single tubulated petal, which grows open towards the top, and is divided into two lips, the uppermost of which is again divided into two, and the lowermost into many segments. The tube of the flower is bent, and sometimes resembles a huntsman's horn; they are produced in clusters, and placed in a cup consisting of a single leaf; this turns to a soft fruit, or berry, of which several grow together in bunches, almost in the manner of alder-berries. They are red when ripe, and are full of hardish, roundish, flattish seeds. It is found growing in the hedges in many parts of England, as well as in our gardens.

CARDIACA, *Mother-wort*, has a root consisting of fibres, proceeding from one head, from whence arise quadrangular hard stalks, two or three feet high, of a reddish black colour. The leaves are veinous and wrinkled, and, though smooth, are covered on both sides with down. The lowermost are round and of a pale green; but they are divided into three segments, dentated about the edges. The higher they are the narrower they grow, and end in a long point, having on each side a single tooth. The cups consist of a single leaf, are hard, and divided into five stiff sharp thorns, attended with many others. The flower is labiated, and consist also of one ear, whose upper lip is imbricated, with pieces laid over each other in the manner of tiles, and is much longer than the lower lip, which is cut into three parts. The pistil rises from the flower cup, attended with four embryoes, and is fixed in the hinder part of the flower like a nail; the embryoes turn into as many small, oblong, angular, smooth seeds, taking up the whole capsula, which was the cup of the flower. It is found wild in England near gardens, from whence it has been thrown out. It is said to cure convulsions, open obstructions of the viscera, and to kill worms; some account it excellent in diseases of the spleen, and the hysteric passion. The dose of the leaves in powder is a drachm, and must be taken in wine.

CARDUUS BENEDICTUS, *the blessed Thistle*, has a white fibrous root, and leaves lacinated like dandelion, but deeper, hairy, and terminating in short pedicles; they are alternately placed on the stalks, which are villous, streaked, and sustain large flowers, consisting of florets that are divided into segments, five with a pistil cut into three or five small stamina, on which are long apices or heads adhering to each other, and as it were forming a tube. The calyx is scaly, in the shape of a pear, and armed with branched spires, as well as with large leaves in the form of a head, covered with a great deal of down; the leaves are long, streaked, yellowish and downy. The whole plant is remarkably bitter, except the root, which is milder. It is resolvent and strengthening, promotes sweat, and restrains putrefaction. It is good in weaknesses of the stomach, the moist asthma, the hooping cough, the jaundice, and in all cold diseases; but in spotted fevers and the plague, it is not so good as some authors have pretended. It has often cured agues, when used some time before the fit. In chronical diseases, the infusion of the tops may be taken several times a day. The decoction is often used to provoke vomiting, when a former emetic has failed. A slight infusion is excellent in the loss of appetite after hard drinking, and one that is stronger will occasion a plentiful sweat, and promote all the secretions in general. Some give from an ounce to two ounces and upwards of the juice, and a drachm of the seeds in emulsions, which last, with distilled poppy water, has been given with great success against the pleurisy and rheumatism.

CARDUUS MARIÆ, *Ladies Thistle*, has a long, thick, fibrous root, and long, broad, sinuated leaves, crenated on the edges, with many hard, shining, smooth, stiff prickles, of a light green colour, and variegated with lines or stripes of white. The stalks are about as thick as one's finger, streaked, covered with a hairy down, are branched, and two or three cubits high. The flowers grow on the heads of the branches, and consist of many purple tubulous florets, divided into five parts at the top, each of which is placed on an embryo in a scaly prickly calyx. Each embryo turns into a smooth oval seed, a little flattish, and furnished with down. It grows in uncultivated places, and by the way sides. The tender leaves, after the prickles are taken off, are eaten by some as a salad, and are said to have the same vir-

tues as *carduus benedictus*. The seed is excellent for the pleurisy, rheumatism, and pains of the breast; it is given in emulsions from one drachm to two.

CARYOPHILLUS, *Clove July flowers*, or *Carnations*, have a single fibrous root, with many smooth stalks rising to a cubit in height; they are geniculated, knotty, and branched, with leaves proceeding from every knee, which are narrow like grass, pointed at the end, and of a greenish blue colour. The flowers grow on the top of each branch, and are of different colours, as is well known to all; they have a spicy smell like cloves, and the stamina and apices are white, with a pistil terminating in two or three crooked filaments; the flower cup is scaly at the bottom, denticulated at the top, and membranaceous. The pistil turns to a cylindraceous fruit contained in the calyx, and is full of flat rough seeds, that are black when ripe. There is a great deal of difference, as well in the size and colours of the flowers, as in the number of the petals, which varieties proceed from the difference of their cultivation. They are propagated either from seeds or from layers. The seeds ought to be well chosen, and should be sown in pots or boxes about the middle of April, in fresh light earth, mixed with rotten cow-dung, well incorporated together, covering them about a quarter of an inch thick with the same earth. These should be placed so as to receive the morning sun only till eleven o'clock, and in a month's time they will come up, and be fit for transplantation in the middle of June, into beds of the same sort of earth lying in an open airy situation. They should be planted about three inches square, observing to water and shade them as the season shall require. They may remain thus till the middle of August, and then they should be removed to beds of the like earth, setting them at six inches distant every way, and not above four rows in a bed. When the flowers begin to blow, those that do not break their pods should be reserved to plant in borders, to preserve the seeds; those that burst their buds, and seem to have good properties, should be planted in pots; but you cannot be certain of the value of the flower till the next year. These flowers were formerly greatly esteemed by physicians for their excellent virtues; but they are now of no other use with us but to make syrup, for which purpose the red should be chosen, as they have a pleasant aromatic smell.

CARUUS, *Caraway*, has a single long root, about as thick as one's thumb, with a few fibres, and an acrid aromatic taste. The stalks rise to the height of a cubit, or a cubit and a half, and are smooth, streaked, and branched. The leaves are winged, narrow, conjugated, and cut into small segments, of a dark green colour. The flowers are placed in umbels, are small, rosaceous, and consist of five petals, in the shape of hearts, placed in a ring, and contained in a green cup, with very slender whitish stamina, and green apices or heads. The calyx turns to a fruit, consisting of two small longish seeds, streaked and gibbous on the one side, and on the other plain; they are blackish, acrid, and aromatic. It is sometimes found wild in England in rich moist pastures. There are several sorts, as the *common*, the *large seeded*, the *narrow leaved*, with *asphodel roots*, and the *alpine Caraway*. They are all to be seen in the gardens of the curious, and are cultivated by sowing their seeds in the spring of the year, in a moist rich soil. They should be hoed out to about six inches square, which will greatly strengthen them, and promote their seed plentifully. When the seeds are ripe, in autumn, the plants should be cut, and laid upon mats to dry, after which their seeds may be taken out and kept for use. They are stomachic and diuretic, and numbered among the four greater

hot seeds. They incide gross humours, disperse wind, appease the cholic, and help digestion; but they are bad in very hot constitutions and inflammations. The dose, in powder, is from a scruple to a drachm.

CASTANEA, the *Chestnut-tree*, is large, tall, and full of branches, and sometimes grows to a large size. The wood is solid, durable, and not obnoxious to putrefaction; it crackles in the fire, and has smooth, spotted, blackish bark, inclinable to an ash colour. The leaves are large, being about two inches broad, and four or five long; are thin, rough, wrinkled, and cut on the edges, with many transverse veins on the back, which run from the rib in the middle. The male flowers, or catkins, consist of many stamina, which proceed from a green cup, composed of five leaves, and have yellow heads. They are fixed to a small capillament or axis, and are barren. The outer coat of the fruit is very rough and prickly, and grows distinct from the flowers. In each hulk, or covering, there are two or three kernels or nuts, which are sometimes an inch in length, and of a roundish flat shape. This is the tree that is planted, but there is another sort which grows wild, and differs from the former only in being less in every sense. Chestnuts are of great use in many countries, where they eat them instead of bread, especially in the mountainous parts of France. Some boil them, and others roast them in pans over the fire; but whatever way they are prepared, they are windy and hard of digestion; and consequently seldom agree with any, except laborious working people.

CENTAURIUM MAJUS, the *greater Centaury*, has a thick, solid, heavy root, three feet in length, and blackish without, but reddish within, with a sweetish, astringent, biting taste. The stalks are round, and rise to the height of two or three cubits, with many branches; the leaves are large, and divided into several parts in the form of a wing. The particular leaves, of which they are made up, are near a span in length, and three or four inches broad, not unlike those of walnuts; they are smooth, serrated on the edges, full of nerves, and of a deep green colour. On the tops of the branches there are small heads or flowers, consisting of blue florets, divided into five parts, and placed upon an embryo in a scaly cup, but the scales are without points. The embryo turns to an oblong, smooth seed, furnished with down, like those of *carduus benedictus*. It grows wild among the Alps, from whence it is brought to us; but it is cultivated in gardens, and may be propagated either by sowing the seeds, or parting the roots, the latter of which is most commonly practised in England. The best seasons for this work, are October and February.

CENTAURIUM MINUS, the *lesser Centaury*, has a small, white, woody, fibrous root, with a branched angular stalk, about a span in height. Some of the leaves lie on the ground, while others are placed on the stalk by pairs. The flowers grow in clusters on the top of the branches, and consist of single petals, in the shape of a funnel, and are of a beautiful reddish colour. The cup of the flower is composed of five sharp leaves, and a pistil, fixed in the lowest part of the flower, which turns to a membranaceous fruit, half an inch long, of a cylindrick shape, and full of exceeding small seeds. It grows wild upon dry arable land, and chiefly among corn. Both the flowers and leaves are extremely bitter, and the florid tops incide gross humours, strengthen the stomach, help digestion, open obstructions of the viscera, cure the jaundice, and the suppression of the piles. The dose in powder is to a drachm. Outwardly, it is vulnerary, and cures recent wounds, and old ulcers.

CEPA, the *Onion*, is of several kinds, but the

most usual are, the *common Onion*, the *red Spanish Onion*, the *Scallion*, and the *Ciboule*.

CEPA VULGARIS CANDIDA, the *common white Onion*, has a bulbous root, consisting of various coats, the outermost of which are membranaceous, and the innermost fleshy, with many fibres at the bottom. The leaves are long, fistulous, round, and sharp at the points; the stalk is naked, upright, and sometimes rises to the height of two or three cubits, especially in hot countries; this is likewise hollow, swells out in the middle, and the flowers are collected into a spherical head; they are composed of six petals or leaves, in the middle of which are six stamina, and a pistil, which turns into a roundish fruit, divided into three cells, full of roundish black seeds. They are propagated by seed, which should be sown in the beginning of March, on good rich sandy ground, and eight pounds is sufficient for a whole acre of land. About a month or six weeks after sowing, they will be ready to hoe, which should be done with one two inches and a half broad, cutting out, not only the weeds, but the onions, where they are too thick. This is best done in a dry season, and should be repeated twice more, cutting out the weeds as before. Towards the beginning of August, the onions will be at their full growth, which is known by the blades falling to the ground, and shrinking; but before they are quite withered, they should be drawn out, cropping off the extreme part of the blade, and then laying them upon a dry spot, turning them every other day for a fortnight, lest they should take root again. The Spanish onions are much in esteem, but will not long preserve their kind here, without fresh seeds from Spain or Portugal. They are chiefly preserved for the kitchen use, and are eaten raw by some, and roasted by others; but they are generally boiled. They are windy, heating, occasion troublesome dreams, and cause thirst; and therefore are bad for hot constitutions. However, when boiled, and mixed with honey, they are good in disorders of the lungs, arising from a thick clammy phlegm. When roasted, they are used by some to ripen boils.

CEPA ASCALONICA, *Scallions*, consist of several bulbous roots, somewhat larger than a hazel nut, have the taste of common onions, but not so strong nor so disagreeable. The leaves are slender, fistulous, round, smooth, and have the same taste. It is used in the spring, instead of green onions, in some countries, but it is now much neglected here. It is easily propagated, by parting the roots in the autumn, and then they will be ready for use in the spring. They must be planted three or four together, in a hole, at about six inches distant every way, for they multiply exceedingly. They have the same virtues as onions.

CEPULA, *five* CEPA FISSILIS, the *Ciboule*, is intirely like the Scallion, only it is larger in every sense, and differs in the acridity of its taste. They are planted for the same use as the former.

CERASUS, the *Cherry-tree*, is of different kinds, as the *red garden Cherry*, the *large Spanish*, the *red heart*, the *white heart*, the *bleeding heart*, the *black*, the *May*, the *black or Mozzard*, the *arch-duke*, the *yellow Spanish*, the *Flanders cluster*, the *carnation*, the *large black*, the *rose-flowered*, and the *double-flowered Cherry*; the *common white Cherry*, the *wild northern English*, with late ripe fruit, the *rock or perfumed*, the *Cherry-tree with striped leaves*, the *amber*, the *morella*, and the *Hertfordshire duke Cherry*.

CERASUS SATIVA FRUCTU ROTUNDO RUBRO ET ACIDO, the *common red or garden Cherry*, is a tree that is neither tall nor strait, which consists of a great many brittle boughs, with a moderately thick trunk, covered with a reddish bark, and the heart is of a blackish colour, but the

sap is whitish. The leaves are large, oblong, shining, and crenated on the edges. The flowers are rosaceous, consisting of several white petals, with stamina of the same colour; the flower cup is divided into five crooked segments, from whence arises a pistil, that turns to a well known fruit with long slender pedicles. It produces a yellowish shining gum, without taste or smell.

The *large Spanish* CHERRY grows on a tree not much unlike the former, but it is not so high, and therefore the sooner bears fruit. The stalk or pedicle is shorter and thicker than in the other kinds. Both these are cooling; and boiled in water, with a little sugar, make a pleasant drink for persons of hot constitutions; but those that have a weak stomach, abounding with acid humours, ought to abstain from them.

Heart CHERRIES are so called from being shaped somewhat like a heart, and the trees have larger leaves than the common sort; for they are somewhat like those of the chestnut tree, and hang downwards. The fruit has a harder and sweeter flesh, and are consequently more wholesome. All sorts of cherries are propagated by budding, or grafting the several kinds into the stocks of the black or wild red Cherries. The stones of these two kinds are sown in beds of light sandy earth in autumn, and when they rise, they must be carefully weeded. They should remain in these nursery-beds till the second autumn after sowing, at which time you should prepare an open spot of good fresh earth, into which you should plant out the young stocks, at three feet distance from row to row, and about a foot asunder in the rows. The second year after they are planted out, they will be fit to bud, if intended for dwarfs; but if for standards, they will not be tall enough till the fourth year; for they should be budded or grafted near six feet from the ground.

CERASUS NIGRA, *the black Cherry tree*, is tall, with an upright trunk, and covered with a smooth, spotted, ash coloured bark, that is greenish on the inside. The leaves are oblong, shining, and deeply crenated. The flowers are joined together, as it were in a sheath, with slender, long pedicles or stalks, from which proceed round, small, sweet fruit, with somewhat of bitterness. It is not now kept in the shops; but it is common to steep them in brandy for a dram, which is known by the name of cherry brandy.

CHÆREFOLIUM, *Chervil*, has a single white fibrous root, with a stalk rising to a cubit and a half high, which is brown, streaked, hollow, geniculated, smooth, and branched. The leaves are like those of hemlock, but less, and they, as well as the pedicles or foot stalks, are of a faint reddish colour, and a little hairy. The flowers grow in umbels on the tops of the stalks, and are rosaceous, consisting of five white unequal petals, in the shape of a heart, with as many white stamina, and a flower cup, that changes into two oblong seeds, gibbous on one side, and flat on the other, which are black when ripe, and in shape like the bill of a bird. It is planted in gardens for sallads, by sowing the seeds in autumn, soon after they are ripe, or very early in the spring. If it be suffered to sow itself, it will thrive better than when cultivated by art. It is said to be inciding, attenuant, and aperient. It promotes urine so much, that Geoffroy takes it to be a specific against the dropsy, and he affirms, if chervil will not cure it, he does not know what will. The juice should be expressed from the fresh herb, or put in an earthen pan, and exposed to a violent heat, after which the juice is to be expressed out. The dose is three or four ounces, every third or fourth hour; or a decoction may be made of it with water, and then five or six ounces is a dose.

CHAMÆDRYS, *Germander*, or *ground Oak*, has fibrous creeping roots, with quadrangular stalks, that are branched and hairy, on which the leaves are set by pairs, and are of a beautiful green; they are half an inch long, and near a quarter broad, with a narrow base, and crenated from the middle to the end. The flowers arise from the places where the leaves join to the stalk, and consist of a purplish, labiated, single leaf; but the upper lip is wanting, and in its place there are crooked stamina, with a forked pistil. The beard, or lower lip, is divided into five parts, and the middle segment, which is largest, is hollow like a spoon, and sometimes divided into five segments, containing four roundish seeds, that proceed from the pistil. Both the leaves and flowers are in use, and grow wild in many parts of England. The leaves are bitter, and a little aromatic; they incide gross humours, restore the tone of the solids, and promote urine and sweat.

CHAMÆMELUM, *Camomile*, has a slender fibrous root, and slender branches, divided into many wings, which are eight inches high or higher. The leaves are slender, and cut into five segments; the flowers grow at the top of the stalks, and are for the most part radiated with white petals, and a yellow disk, which consists of many yellow florets; but the crown is composed of white semi-florets, and placed upon embryos, comprehended in a scaly cup. These turn into slender, oblong, naked seeds. The whole plant has a physical smell, which is not disagreeable. It grows wild in great plenty, on most of the large heaths near London, and is propagated for use, in physic gardens, by parting the roots, and planting them about eight or ten inches distant, every way, for they spread greatly. The proper time is in March, and they thrive best in a poor soil.

CHAMÆMELUM FOETIDUM, *five* COTULA FOETIDA, *stinking Camomile*, has a fibrous root, with round, greenish, brittle, succulent stalks, divided into many wings. It is thicker and higher than common camomile, with larger leaves, of a blackish green colour; but the flowers are much the same. It is easily known by its strong smell. The floret tops, and the leaves of both, are in use, but more particularly the flowers. Common camomile is an excellent carminative, and powerfully dissolves wind, curing the cholic proceeding from thence, as well as in the convulsive cholic. They are also good in diseases of the breast, and more particularly in tumours of the stomach, proceeding from a violent heart-burn; as also in pains of the gravel. Externally, they are emollient and discutient, and are excellent in bruises, to disperse coagulated blood. Hence they are used in fomentations, cataplasms, pægoric clisters, uterine injections, and baths. The common method of taking them is as tea.

CHAMÆPITYS, *ground Pine*, has a slender, fibrous, white root, with stalks partly upright, and partly lying on the ground. They are villous, nine inches high, and two leaves proceed from every knot, an inch in length, and are somewhat in shape like those of the pine tree, from whence it has its name; they are of a yellowish green. The flowers proceed from the places where the leaves join to the stalk, and have only a single petal, and a single lip; they are of a yellowish colour, and the lower lip is divided into three segments, the middlemost of which is parted in two. In the room of the upper lip, there are a few teeth, with stamina, of a light purplish colour. The flower cup is villous, divided into five segments, and contains four triangular brown seeds. The whole herb is in use, and has a pitchy or turpentine smell.

CHAMÆPITYS MOSCHATA, *Musk ground Pine*,

Pine, creeps on the ground like the former, but the stalks are harder. It has the same sort of flower, but of a purple colour, and the seeds are black, curled, and longish. The whole herb is very hairy, with a bitter taste, and a strong resinous smell, with somewhat of the scent of musk. These are numbered among the vulnerary, aperient, cephalic, hysterick, and nervine plants. The dose of the powder is a drachm, either alone, or with that of germander, in red wine; but it may be boiled in whey, when wine is not proper, and the decoction drank every morning.

CHEIRI, the *Wall-flower*, has a flower composed of four yellow petals, which are placed in the form of a cross, and out of the flower cup rises the pistil, which becomes a long flat pod, divided by a partition, into two cells, to which the valves adhere on both sides, and are furnished with smooth round seeds, with borders round their edges. The leaves are green, and acuminate at the end. It grows upon old walls, and flowers in June. They are said to be cordial, to ease pains, and to be good in the apoplexy and palsy.

CHELIDONIUM, *Celandine*, has a fibrous hairy root, and the lower leaves are large, a span long, lobated, of a fine green above, but of a bluish green below, and a little hairy. The lobes are roundish, have ears, and are placed one against another; they have also large veins and incisures. The stalks rise to a cubit in height, and upwards, are knotty, brittle, fistulous, and branched with leaves alternately placed. From the places where they join to the stalks at the top, flowers proceed, with a pedicle, a palm in length, and flowers collected in umbels. The flowers consist of four gold coloured petals, placed in the form of a cross, and the calyx consists of two leaves which soon fall off. The pistil of the flowers turns to a pod, an inch and a half long, which is round, slender, bivalved, and a little wrinkled; it is at first green, afterwards reddish, and pours out black, shining, roundish, flat seeds. The whole plant has a strong smell, and wherever it is wounded, pours out a liquor of a saffron colour, which is acrid and biting. It delights in watery shady places, and may be propagated, by sowing the ripe seeds in any corner of the garden. The colour of the root is red, and it is full of a bitter, acrid, burning juice. Some have given it inwardly to open obstructions, to promote urine and sweat, and to cure the dropsy; but others think it not safe for inward use, for in some cases, an infusion of two ounces of the root has been attended with dreadful symptoms. It is common to rub warts with the juice, to take them away.

CHELIDONIUM MINUS, *Pile-wort*, has a root consisting of tubercles, of the size of a grain of wheat, with many slender whitish fibres, which are pale without, but white within. The stalks rise to a palm in height, are slender, and most of them lie on the ground; the leaves are roundish, smooth, and shining, like those of ivy; and on the top of the stalks there is a rosaceous flower, like a ranunculus, consisting of eight or nine petals of a gold colour, placed in a circle. There are many saffron coloured stamina in the middle, placed in a cup, consisting of three leaves. The pistil is placed in the middle of the flower, and turns to a roundish prickly fruit, of a greenish yellow colour. It grows in meadows, and by the sides of high-ways. The leaves are without acrimony; but the roots are said to cool and moisten. It is looked upon as an antiscorbutic plant, and the fresh leaves are eaten in some places as a sallad.

CICORIUM, *wild Succory*, has a root a foot in length, and about as thick as a man's thumb, with a few fibres, and full of a milky juice. The stalk is strong, hairy, branched, and grows to a cubit and a

half high, with leaves like those of dandelion, but larger, and they are hairy, and of a dark green colour. The flowers consist of many bluish semi-florets, placed upon an embryo, contained in a calyx, which being contracted, turns to a capsula, full of angular, naked, short seeds. The leaves and roots are bitter, and it not only grows wild, but is planted in gardens, and flowers in June. The fruit, leaves, and flowers, are in use, but the wild is better than the garden succory. Some use it as a sallad, when young. It is accounted good to resolve thick clammy humours, and to strengthen the solid parts, as well as to temperate the hot intemperaries of the viscera; for which reason, it has been given in recent obstructions of the liver, and against the jaundice. The juice taken in large quantities, so as to keep up a gentle diarrhoea, and continued for some weeks, has been found to be excellent against the scurvy, and other chronical disorders. The dose of the juice is four ounces.

CICUTA, *Hemlock*, has a root a foot in length, and as thick as one's finger, and before the stalks are produced, solid, and before they are grown, fungous. The stalk is streaked, fistulous, smooth, and grows to the height of three cubits and upwards; some are greenish, others reddish, and others again spotted like serpents. The winged leaves are cut into many minute segments, and nearly resemble those of parsley, for which it has been often taken while young. The flowers are collected in umbels, on the top of the stalks, and are rosaceous, consisting of five white petals, in the shape of hearts. The calyx turns to a globous fruit, containing two small seeds, gibbous on one side, and streaked on the other; and of a palish green colour. The whole plant has a disagreeable strong smell. We have several histories both of its good and bad effects, which render it probable, it was not the same plant that was eaten. We shall take no notice of the properties ascribed to this plant by Dr. Stork; for, though we greatly admire that gentleman, and believe what he says respecting *Hemlock*, and its effects in Germany, yet we have the mortification to find it does not produce the same effects in England. Outwardly it is sometimes applied to hard and scrophulous tumours, and to reduce the size of women's breasts, when they are grown too large; as also to keep back the milk in those that do not give suck.

CINARA HORTENSIS, the *Artichok*, has a thick strong root, with leaves a foot, or a foot and a half in length, divided into several broad segments, beset with a hairy down. At the top of each branch there is a turbinated head, surrounded with large acuminate scales, which are fleshy, and of a bluish green colour, and are very thick at the bottom. The scaly head or calyx being taken off, there are seen underneath flowers, consisting of many florets, of an elegant greenish purple, which are divided into five parts, and placed upon embryos, each of which turns to an oblong swelling seed, covered with a smooth ash coloured rind, and furnished with long down. The lower part of the cup or placenta, is fleshy, and is the part which is eaten.

CARDONES, the *spiny Artichok*, differs in nothing from the former, but in having prickles at all the corners of the leaves and flower cup.

The manner of propagating the first sort, is from slips or suckers, taken from the old roots in March, which, if planted in a good soil, will produce large fair fruit in the autumn following. The prickly artichok, or chardon, is propagated by seed in the middle of March, which should be sown in an open bed of light rich earth. When the plants appear above ground, they should be carefully weeded, and in dry weather often watered. In the middle of May, they will be fit to transplant into beds of light

rich earth, placing them in rows a foot asunder, eight inches distant from each other, observing to water them constantly, till they have taken root. In the beginning of July, they will be strong enough to plant out for good, in a spot of light rich ground, placing them in rows of four feet distant each way, observing to water them constantly as before, till they have taken root. In August they will be fit to tie up with hay bands, in a dry day, bringing the leaves as close together as possible, without bruising them. Then with a spade the earth must be banked up round the plants, leaving about ten inches, or a foot of the tops uncovered, taking care that the earth does not get into the middle. As the plants advance in height, they must be earthed up from time to time; for, if they thrive kindly, they will grow to the height of four feet, and will, when taken up for use, be near three feet, when trimmed of their outer leaves; for the tender branched part is only valuable. This by some is accounted a great delicacy.

Some eat the flesh of the smooth Artichoaks with salt and pepper, they being thought proper to help digestion. As for their physical uses, they are not said to have any, only the roots are commended to promote urine.

CITREUM CITRUM, *five* **MALUS MEDICA**. The *Citron tree* is called **MALUS MEDICA**, because it was first brought into Europe from Media; it is of a moderate height, with a branched spreading root, yellowish without, and whitish within. The trunk is slender, the wood white and hard, and the bark of a pale green. The boughs are numerous, long, slender and tough, and the oldest of them are of a light yellowish green, and armed with pale prickles; but those that are more recent, are of a beautiful green. The tops of the branches are tender, and of a brownish red green, as well as the leaves, which are of the size of those of the walnut-tree, generally blunt, but now and then acuminate, and they are three times as long as they are broad; the lower part is not so green as the upper, and the edges are a little serrated. The tree is always clothed with them, both winter and summer, and when they are held up against the sun, they appear to have holes in them, like St. John's wort, or rather full of transparent specks. The flowers grow on the tops of the branches, and are rosaceous, with fleshy petals, which are generally five in number, and stand almost upright; without they have a reddish blush, but are white within, and placed in a ring. The calyx is small, and divided into five segments, and under the yellow apex there are a great many stamens, and part of the flowers are fruitful, and part barren. Among the stamens there is a longish pistil, the rudiment of the fruit, and those flowers that are without never produce any. The shape of the fruit is oblong, but sometimes globous, and some terminate in a point, while others are blunt; the surface is wrinkled and tuberose, and is often nine inches in length, and upwards. The size is different, as well as the weight; for some weigh six, nine, and even thirty pounds. The outer rind is tough, thin, bitter, and hot, and the colour is at first green, which turns to that of gold, when ripe; the inner or white rind is thick, firm, sweetish, with a little acidity. Within it is divided into several cells, full of an acid juice; the seeds are numerous, for sometimes an hundred and fifty have been found therein; they are oblong, half an inch in length, and sharp at both ends; they are bitter, yellow without, covered with a streaked skin, and contain a double white kernel. In hot countries both flowers and fruit may be seen on the tree at the same time, as well in the spring as the autumn; but they are more plentiful in the last.

CITRONS are not used as an aliment, but as a

saucy, and are cut into small slices, as we do lemons, to garnish the dishes, and to squeeze upon the meat. The acid is very agreeable, excites a weak appetite, and helps digestion, when used moderately. The outward rind, on account of its hardness, is not easy of digestion. It is an excellent remedy against the scurvy, and is a kind of specific to cure that disease, as well as the juice of oranges and lemons; when the gums of patients, afflicted with that disease, are ulcerated, this juice will cure them. The juice is also good in burning and malignant fevers, to quench thirst, and to restrain the heat and effervescence of the blood. Besides, the juice of citrons is diuretic, cleanses the kidneys of small gravel, and restrains vomiting, proceeding from bilious humours. The flowers, as well as the leaves, have an exceeding fine refreshing smell, though they will not prevent contagion on this account, as some pretend. The outer yellow bark has also a very fine aromatic smell, because it has a prodigious number of vesicles full of essential oil. Being chewed, it mends the breath, and by its bitterness strengthens the stomach; it powerfully discusses wind, and concocts crude humours in the stomach and intestines. However, the juice is not good in the pleurisy, inflammation of the lungs, spitting of blood, a consumption, and the like.

MALUS LIMONIA, the *Lemon tree*, is placed here on account of its affinity with the former, and is pretty tall, though not very full of branches; the leaves are like those of the citron tree, but shorter, and the prickles are more numerous, but less, and venomous. The flowers have much the same smell, and the shape of the fruit is likewise oval, but shorter, and not of so deep a yellow. Likewise, the rind is thinner, and they are much more full of juice, which is more acid than that of citrons. Upon which account it is thought to be more cooling, and more efficacious in hot diseases; in short, what has been said of the juice of citrons, may in most respects be applied to this.

COCHLEARIA HORTENSIS, *garden Scurvy-grass*, has a white, thickish, strait, fibrous and hairy root, with many roundish leaves, of a deep green colour, about an inch in length, which are hollow, almost like a spoon; they are thick, full of juice, and placed upon pedicles, a palm in length. The stalks are branched, upright, smooth, a cubit in height, and have leaves that are more jagged than those next the root; they are also longer, and without pedicles. The flowers have four petals, which are white, and in the form of a cross, with a calyx, consisting of four leaves, and a pistil that turns to a membranaceous round fruit, the sixth part of an inch in length, and composed of two cells, full of small, round, reddish seeds. But a distinction ought to be made between the garden and sea scurvy-grass; for the leaves of the former are always roundish, and of the latter sinuous. It is propagated by sowing the seeds at the latter end of July, soon after they are ripe, in a moist shady spot of ground. When the plants are come up, they should be thinned so, as to be left at four inches distance each way, and in the spring they will be fit for use; for those that are suffered to remain will run up to seed in May. They must be sown every year.

This plant has its English name from its virtue in curing the scurvy, against which it is accounted a specific. In some parts of England they brew an ale therewith, which is recommended by many to cure the same distemper. However, it is more effectual when mixed with sorrel, or some such acid herb, because of itself it is too hot, and if used too freely, will produce bad symptoms. The people that inhabit cold countries, are not ignorant of this mixture, for they have learnt by long experience, that scurvy-grass, and sorrel together, make an excellent

remedy against this disease. Scurvy-grass is not useless in other diseases; for it is excellent in recent obstructions of the viscera, in the green sickness, and some sort of asthma; but the dried leaves are not near so valuable as the fresh. The dose of the leaves, in decoction, is from a pugil to a handful, and of the juice from one ounce to three. Externally it is good in scorbutic disorders of the mouth, in the bloody swelling of the gums, and to fasten loose teeth, the gums being rubbed with the juice, or held in the mouth as a gargle.

COLCHICUM, *meadow Saffron*, whose flowers appear, near the beginning of autumn, before there are any leaves. These flowers consist of a single petal, which proceed from the root itself, and are in the form of a very small white tube, divided into six segments. They are somewhat like the florets of saffron, but of a lighter colour, with internal stamina, of a pale yellow, and a pistil arising from the bottom of the flower, and terminating in slender hairs. In a day or two's time they begin to wither; but in the following spring, three or four oblong, broad, smooth, flat leaves, shoot out, like those of the white lily. Between these are seen three or four thick, oblong, triangular bladders, like pods, divided into three cells, which open when they are ripe, and are full of a reddish, black, roundish seed. The root is bulbous, turbinated, but flat on one side, on which is a furrow, when in flower, that does not appear at any other time. It is covered with a blackish coat, and has a few fibres at the bottom. The bulb itself is fleshy, white, and when fresh, it pours out a milky juice as soon as taken out of the ground; but when it is dried, it is blackish without, reddish within, and of a sweetish taste, with a little bitterness. The smell of the whole plant is strong and nauseous. Both antients and moderns agree, that the root is poisonous, and those that eat it feel an itching all over the body, with a biting pain of the internal parts, and of the stomach, with great heat, which afterwards turns to a bloody flux.

CONSOLIDA MAJOR, the *greater Comfrey*, has thick fleshy roots, divided into several parts, black without, but white and clammy within. The stalks grow to the height of a cubit and a half, and are light, hairy, rough, and winged. The leaves are two spans in length, and a palm in breadth; they are of a dark green, rough, hairy, and sharp at the point. The flowers grow at the top of the branches, and are placed in elegant rows, and before they open are rolled up like the tail of a scorpion; they are pendulous, consist of one flower, in the shape of an oblong funnel, and are of a whitish or purplish colour; they are a quarter of an inch in length, and slightly divided into five segments; the cup is also divided into five parts, and has a long pistil of the same colour with the flower, which turns into four seeds, that are black and shining, and resemble vipers heads. It grows wild on the sides of banks and rivers, in several parts of England, and may be propagated by sowing the seed, or parting the roots in autumn, which is best. They should be planted about eighteen inches asunder, that they may have room to spread. The root is only in use, and has the same qualities as that of marsh-mallows. The dose of it in powder, is to a drachm, and in decoction or infusion to an ounce. It is commended in ulcers of the lungs, and other disorders that proceed from the acrimony of the humours.

CORIANDRUM, *Coriander*, has a slender, white, single root, with a few fibres; as also a single, slender, round, smooth stalk, full of pith, that is branched, and rises to the height of a cubit and a half. The lower leaves are broad, and conjugated, but the upper are deeply cut into five segments; the flowers grow in umbles, at the top of the branches, and are rosaceous, and of a whitish pur-

ple colour; they consist of five petals, in the shape of a heart, with a calyx that turns to two seeds, that, when together, make up a whole sphere; they are green at first, but afterwards of a palish yellow. The smell of the whole plant is strong and aromatic; but that of the seeds becomes more mild, and they have a sweet agreeable taste. This plant is propagated by sowing the seeds early in the spring, in an open situation, and in a bed of good fresh earth; when the plants are come up, they should be hoed out to about four inches every way. The seeds have a carminative virtue, and are good against catarrhs, flatulencies, worms, the cachexy, and slight obstructions of the glands. The dose of the seed, in powder, is from a scruple to a drachm.

COTONEA MALUS, the *Quince tree*, is of several kinds, as the *Pear Quince*, the *Apple Quince*, the *Portugal Quince*, the *Quince tree, with oblong, smooth, sweet fruit*, the *Quince tree with lesser oblong, downy fruit, which are not eatable*, and the *common Quince tree, with narrow leaves*.

It is a dwarf tree, with a branched root, and is covered with a brown bark; it is sometimes strait, and has many slender branches on the top. The leaves are roundish pointed, and of the size of those of the apple tree; they are not cut on the edges, and on the lower part they are covered with a soft down, but on the upper they are greenish and smooth. The flowers grow single, and are rosaceous like the wild rose, consisting of five roundish petals, half an inch broad, and of a flesh colour; in the middle there are many purple stamina, with yellow apices, and the flower cup is composed of five greenish, hoary, villous leaves, which, when the fruit is grown, appears at the top thereof. The fruit is of different shapes, which have been above taken notice of; the seeds are in the middle of the quince, and are like those of pears; but they are rendered slippery by a sort of slime that covers them. When quinces are unripe, they are seldom or never eaten, especially raw; but when they are boiled, they are very well liked by some. They are greatly astringent, strengthen the stomach, and may be of some use in all sorts of fluxes. The use of quinces is very well known for the making of marmalade; the seeds are so mucilaginous, that an ounce of them will render three pints of water thick and ropy, like the white of an egg. A spoonful of the marmalade is good in coughs, for it incises clammy phlegm, and causes expectoration; and it is the more valuable, because those that refuse other medicines will take this.

CUCUMIS SATIVUS VULGARIS, the *common Cucumber*, has strait roots, with many white fibres, and thick, long, branched, hairy stalks, creeping on the ground, on which are leaves alternately disposed, a palm or two in breadth, serrated on the edges, and rough to the touch. They are furnished with clasps, and the flowers proceed from the places where the leaves join to the stalks, which are in the form of a bell, divided into five segments, and half an inch in length. They are of a pale yellow, and some are fruitful, others barren; the fruitful have an embryo, which turns to a fruit that is sometimes six inches long, and is extremely well known. The seeds only are in use, and are reckoned among the four greater cold seeds. As for the flesh or pulp, it is unfit for nourishment, and is generally offensive to the stomach, especially if not corrected with a good deal of pepper, as well as vinegar. However, they agree extremely well with some who eat them frequently, without any bad consequence. The seeds are cooling, and sometimes emulsions of them have been prescribed in burning fevers, a fit of the gravel, and heat of urine.

CUCUMIS AGRESTIS, *wild Cucumber*, has a root two or three inches thick, and divided at the bottom into various fibres; it is white, fleshy, and

has

has a bitterish and nauseous taste. The stalks lie on the ground, and are rough, thick, and furnished with leaves above a palm in length, that are roundish, acuminate, and have ears at the base. The flowers proceed from the hollows where they join to the stalk, and consist of a single petal in the shape of a bell, which is deeply divided into five parts, and is of a yellowish colour with greenish veins. The fruit grows to two inches in length, is in the shape of a cylinder, and covered over with rough studs. It is divided into three cells full of a bitter juice, and when ripe, they pour it out upon the slightest touch in a violent manner with the slippery seeds, which are broad, smooth, and blackish. It grows in the southern parts of France, near the highways and among rubbish, and is also planted in gardens; not only for variety, but for diversion upon the above mentioned account. It may be propagated by sowing the seeds in the spring in an open warm border; and, when the plants are come up, they should be transplanted into an open bed, about six or eight feet distant, because they creep very far. The fruit is ripe in autumn, and the seeds will sow themselves without any farther trouble. *Elaterium* is made of the juice of the ripe fruit, and is a most violent purge, and particularly evacuates serous humours both upwards and downwards; for which reason some prescribe it in a dropsy, and give half a grain at first, and afterwards from two or three to five; however, it should be exhibited very cautiously.

CUCURBITA, *the Gourd*, has stalks as thick as one's finger, that run along the ground, or climb by the help of clasps; the leaves are round, and are from a foot to a foot and a half broad, and covered with a down, as well as a little crenated at the edges. The flowers proceed from the hollows where the leaves join to the stalk, are white, and in the shape of bells; they are cut into five segments, but so deep that they seem to be so many petals. Some of the flowers are barren, others fruitful, which last have an embryo that turns into a fruit, which is sometimes two yards long; but this is very rare. It has a thick neck and a moderate belly; and, when ripe, has a hard rind, of a yellowish colour, with a white tasteless pulp, or flesh, that is pretty spongy. It is divided into five cells, containing oblong flat seeds, almost an inch in length; but have sometimes a border round them. There are four sorts, namely, the *Long Gourd*, with a soft leaf and a white flower; the *Sickle shaped Gourd*, with a soft leaf and a white flower; the *flat Gourd*, with a soft leaf and a white flower, commonly called *Squashes*; the *bottle shaped Gourd*, with a soft leaf and white flower. There are several other varieties every year brought from America; but the seeds will not produce fruit of the same shape for two years together. They may be all propagated by sowing the seeds on a hot bed; when the plants are come up, they should be removed to a moderate bed; and when they have got four or five leaves, they should be transplanted into holes made upon an old dunghill; but they should be allowed a great deal of room to creep, because some have run forty feet from the holes; and if the side branches were permitted to remain, they would overspread twenty rods of ground. The seeds are numbered among the four greater cold seeds, and emulsions made therewith temperate the acrimony of the urine, and often procure rest.

CUPRESSUS, *the Cypress tree*, is of five kinds, namely, the *common Cypress tree*, the *male spreading Cypress*, the *Virginian Cypress*, with leaves like *Acacia*, that fall off in winter, the *spreading Portugal Cypress* with smaller fruit, and the *American Cypress* with the least fruit, commonly called *white Cedar* in America. The first sort has a strait thick trunk, palish, and sometimes reddish, and a very sweet smell. The male

has a spreading top, but in the female it is collected as it were into a point. It is an ever-green, and the leaves are like those of *savine*, the shoots being very small, and seemingly covered with scales. The catkins consist of very small leaves, or scales, and under them are apices that pour out an extremely fine powder; the fruit grows on other parts of the tree; this is roundish, and composed of many woody tubercles; and in the clefts between them there are reddish, hard, angular seeds, round at one end and sharp at the other. It is very common in many of the old gardens in England; but at present is not much in request, though for what reason is hard to say. These trees are all propagated from seeds, which should be sown early in the spring, on a bed of warm, dry, sandy earth, sitting the same earth over them to half an inch thick; in a month's time the young plants will appear above ground, and should be often watered in dry weather. In two years time they will be strong enough for transplantation into a nursery, and the best season is the middle of April, in a cloudy day, at the distance of eighteen inches in rows, observing to close the earth well to their roots. They may remain here three or four years; and when they are planted out for good, it should be at the distance of twenty feet every way, taking care not to shake the earth from the roots.

CYANUS, *Blue-bottle*, has a woody fibrous root, and stalks that sometimes rise to the height of a cubit and a half, which are angular, hollow, covered with down, and branched. The lower leaves are sinuated, not much unlike those of dandelion; but the rest are narrow and long, with a single nerve running through the whole length. The flower has a scaly hairy cup, and the disk is almost flat, but the outer florets round the border are large, tubulous, and deeply cut; the inner florets are less, and the colour of them all is generally blue, though sometimes they are of other colours. The first are always barren, but the others are succeeded by a single naked seed. It increases greatly by its creeping root, and is only fit for large borders under trees, or in wildernesses, because it will overspread the plants that grow near it. They are propagated by taking off sets from the old roots, either in spring or autumn, and will grow in any soil or situation.

CYCLAMEN, *Sow-bread*, has a thick, globular, fleshy root, but somewhat flattish, white within, and blackish without. It has a pungent, burning, disagreeable taste, and from it proceed leaves that are almost round, growing on pedicles a palm in length; they are pretty much like those of cuckow-pint, but not so thick, and are of a blackish green above, with white spots; but below they are purplish, and a little sinuated on the edges. The flowers have long tender pedicles, and consist of a single globous petal divided into five or six segments, that turn down almost to the bottom; they are sometimes of a light, and sometimes of a dark purplish colour, with a sweet smell; the pistil is fixed in the hinder part of the flower, like a nail, and when the flower falls off it curls and bends down to the ground, where it turns to a globous membranaceous fruit, full of oblong angular seeds, adhering to a placenta. These being sown always turn to a root, from whence the leaves afterwards proceed; but it does not flower till autumn, and then it is before they have any leaves. There are several sorts, and particularly one with a white flower; they are both propagated by sowing the seeds soon after they are ripe, in tubs of fresh earth, and in four or five years time they will begin to flower. At first the roots are small, and will produce but few flowers; but they will grow to upwards of fourteen inches in diameter, and then they will produce above an hundred flowers. When the root is dried it will lose its acrid taste, and yet it

will continue to be a violent purge. Country people will take a drachm of it in powder, and half an ounce in decoction; but the internal use of it is not very safe. However, outwardly, it is recommended against hard scirrhus and scrophulous tumours, when applied in the form of a cataplasim.

DAUCUS CRETICUS, *the candy Carrot*, has a long root, about as thick as a man's finger, and has a taste somewhat like a parsnip; the stalk, which is round, streaked, and hairy, grows to the height of about nine inches, on which there are downy ash coloured leaves, divided into narrow segments; however, they are sometimes smooth, and of a blackish green colour. The flowers grow in umbels at the top of the stalks, and are small, rosaceous, and consist of five white petals, whose calyx turns to a fruit composed of two oblong streaked seeds, that are gibbous on one side and flat on the other; they are hairy, and in shape resemble lice.

DENS LEONIS, *Dandelion*, has a root as thick as one's little finger, and the leaves are oblong, acuminate, and lactescent, with deep incisions on the edges like wild succory, but are smoother, and lie on the ground. It has no stalk, and the pedicles are naked, fistulous, round, and above a palm in length; though there is sometimes a little hair, which comes readily off; on these the flowers are placed, which consist of many petals that open in the form of a marygold, and are of a yellow colour. The cup of the flower is smooth and divided into many parts, without which there are four or five green leaves that turn backwards; the semi-florets in the middle have each their proper embryo, and turn to a reddish or citron coloured seed, furnished with long hairy down. It is accounted an aperient, and to open the obstructions of the viscera. Boerhaave is of opinion, that, when it is used for a considerable time, it will dissolve almost all kinds of coagulations, and open the most obstinate obstructions of the viscera.

DIGITALIS, *Foxglove*, has many slender fibrous roots, with a stalk that sometimes grows to two cubits in height; it is thick, angular, hairy, reddish, and hollow, with oblong, acuminate, hairy leaves, serrated on the edges, of a blackish green above, and hoary below. Those at the root have long pedicles, and those at the stalks are placed without any regular order. The flowers are disposed in a long spike, and always pendulous, growing on one side of the stalk, with short hairy pedicles; they consist of a single petal, and somewhat resemble the finger of a glove, from whence it has its name; but it is open at the top, and has, as it were, a lip on each side; it is of a purple colour, excepting the lower part, where it is whitish or flesh coloured. In the lower part of the flower there are purple or white crooked stamina, with apices of a saffron colour. The pistil is slender, purplish, fixed in the back part of the flower, like a nail, and turns to a fruit, or pod, which ends in a point and opens in the middle, it being divided into two cells full of small, angular, reddish seeds; the cup of the flower is generally composed of five leaves. This plant is by many thought to be poisonous, and yet there are country people who give it as a purge in agues; but it works very violently. Some recommend it externally against scrophulous swellings, and for that purpose set the flowers in the sun in May butter, in order to extract their virtues, and this is used as an ointment; but it must be continued a long while.

DRACUNCULUS, *five* **DRACONTIUM**, *Dragons*, or *the many leaved Arum*, has a root that lies deep in the earth, which is almost of an orbicular form, and fills the palm of the hand, with many white capillaments and a yellow rind. The stalk is single, strait, and thicker than one's thumb; it grows to a

cubit and a half high, and is round, smooth, and of several colours, like the skin of a serpent. The leaves have pedicles nine inches in length, and are divided into digitated segments, which are six or seven in number or upwards; they are oblong, narrow, smooth, shining, and there are shafts not so thick as a man's little finger, and at the top there is a vagina, or sheath, a foot long, of an herbaceous colour without, but within of a reddish purple; when it is unfolded, it turns to a flower with a single petal, in shape like an ass's ear, within which there is a blackish, long, thick pistil, bigger than that of arum, and ends in a sharp point; at the base there are a collection of several apices and embryos, each of which turns into a globous juicy berry, disposed like a bunch of grapes, and are all at first green, and afterwards red; they contain a hard seed or two that are somewhat wrinkled. The berries have a hot biting taste. It is cultivated in gardens, and is propagated by the knobby roots, which in two or three years time will afford many off-sets. The best season for transplanting them is in autumn, after the decay of the leaves; they should be set in an open place and in a light soil. The root and leaves have the same virtues as arum, and are said to dissolve gross humours in the lungs and viscera, to open obstructions, and promote urine. The dose of the dried root, in powder, is from one drachm to two. Externally, the root is an excellent remedy against inveterate ulcers; but the fruit is more powerful than the leaves or root.

DRACUNCULUS PRATENSIS, *meadow Dragon*, sometimes grows to three cubits in height, and has a crooked geniculated root, furnished with large long fibres; the stalk is round, smooth, fistulous, slender, and yet pretty stiff. The leaves are placed in no regular order; they are serrated with sharp rough teeth on the edges, and are of a blackish green shining colour, of a hot taste, but milder than pellitory of Spain. The highest part of the shaft is angular, hairy and divided into sprigs, on which are umbellated white radiated flowers, twice or thrice bigger than those of yarrow; their disk consists of several florets set close together, and divided into five segments; but the crown of semi-florets is placed upon embryos in a slender short cup, that afterwards turns to slender seeds; it flowers in July, and the root and leaves have been sometimes in use. The root being eaten is said to purge the head and cure the tooth-ach. Some eat them in fallads.

DRACUNCULUS ESCULENTUS, *Tarragon*, grows to the height of two cubits and upwards. At first the leaves are divided; but when they are full grown, they become like those of flax or hyssop, of a shining blackish green colour. The flowers grow on the top of the branches in bunches, and consist of florets so small that they are hardly visible; however, upon examination, they appear to be tubulous, and divided into five parts at the top, under which are embryos placed in a scaly cup; each embryo turns to a small naked seed. The whole plant is very acrimonious, is aperient, diuretic, and proper to open obstructions; being chewed it provokes spittle like pillitory of Spain. It is mixed with fallads by some to correct the coldness and crudity of other herbs, and because it is good for a cold stomach.

EBULUS, *dwarf Elder*, is somewhat like common elder, but seldom grows so tall as a man; the root is long, fleshy, white, spreading, and of a bitterish, subacid, and nauseous taste; the stalks are herbaceous, angular, streaked, and geniculated, with frequent joints, and are pithy like common alder; the leaves consist of three or four conjugations, with a single leaf at the end; they are longer than the leaves of common alder, as well as sharper, and are serrated on the edges. The flowers are small, grow

in umbels, are white, and consist of a single petal divided into five segments; they have five white stamina, and as many rusty coloured apices; when the flowers are fallen off, the flower cups turn into berries, which are black when ripe, and the juice will colour the fingers purple. It is found wild in some counties of England, but near London is cultivated for use. It multiplies exceeding fast, and, if permitted, will soon over-run a large spot of ground. The off-sets of these roots may be transplanted any time from September to March, and will grow in any soil or situation. The leaves of this plant are bitterish, and the berries very bitter, with somewhat of an astringency. It is a strong purge, but the roots are most powerful as well as its bark. They have been frequently given in the dropsy, but with different success; however, it should not be exhibited at all, except to those that have strong constitutions. The powder of the seeds is given to a drachm; but a rob made of the berries is the most proper to purge off water in dropical patients, and may be exhibited from half an ounce to an ounce.

ENDIVIA, *five* **INDYBUS**, *Endive*, is of three sorts, the *broad leaved* or *common Endive*, the *narrow leaved* or *lesser Endive*, and the *curled* or *Roman Endive*. The first has fibrous roots full of milk, and the leaves spread on the ground before the growing of the stalk. The leaves are like those of lettuce, and now and then crenated on the edges, and a little bitterish: those that grow on the stalk are like those of ivy, but less. The stalk rises sometimes to a cubit and a half in height, and is smooth, streaked, light, and divided into many crooked branches, which pour out a milk when wounded. The flowers and seeds are like those of succory. *Narrow leaved Endive* differs only from the former in having more narrow leaves, and a more bitter taste. The *Roman* or *curled Endive*, has leaves that are bigger than those of the common, which are sinuated on the edges; the stalk also is larger, thicker, and more tender, and the seeds are black. The first and second sorts are now disused in kitchen gardens, as being vastly inferior to the curled kinds. The seasons for sowing the seeds are in May, June, and July, at four or five different times; but that which is first sown is very apt to run to seed, especially if the autumn prove warm and dry; however, it is necessary to have a little sown in May for the first crop. They should be sown in an open situation, and in a good rich soil, but not too thick. When they are come up, and grown to about two inches high, they must be transplanted into another good open spot of ground, at about ten inches distant every way, observing to cut off the largest leaves before you plant them, as also to water them constantly every other evening until they have taken fresh root. Some of the largest must be tied up with osier twigs to blanch, which should be done in a dry afternoon. You must first gather up all the inner leaves of the plant regularly into one hand, and then those on the outside that are sound, pulling off all that are rotten and decayed, placing them as near as possible in the natural order of their growth; then tie it up with a twig very close, about two inches below the top, and about a week after go over the plants again, and give them another tie about the middle. This must be done for the two first sowings; but those of the latter sowings should be taken up in a very dry day, and, with a sharp pointed dibble, plant them into the sides of trenches of earth, which are laid very upright, sideways towards the sun, with the tops of the plants only out of the ground, so that the heavy rains may run off, and the plants be kept dry and secured from frost. They will be fit for use in about a month's time, after which they will not keep good long, and therefore fresh ones should be put into the

trenches every fortnight at least, that you may have a constant supply. The blanched leaves are more tender and more agreeable to the palate than the green. They are cooling and aperient, and serve to temperate the heat of the blood and bilious humours. They are good in the jaundice and bilious fevers, and four ounces of the juice is a dose.

ENULA CAMPANA, *Elecampane*, has a thick fleshy root, of a dusky colour without, but white within, with an acrid, bitterish, aromatic taste. The leaves are a cubit in length, and almost a span broad; they are of a pale green above, hoary underneath, crenated on the edges, sharp at both ends, and soft to the touch. The stalks rise to three or four cubits in height, and are strait, villous, streaked, branched, and support radiated gold coloured large flowers, whose florets are hermaphrodites, but the semi-florets are female; the embryos which are placed on a naked placenta are crowned with down, and are all included in a scaly cup. *Elecampane* grows wild in moist fields and meadows in several parts of England, and is cultivated in the gardens near London. It may be propagated by seeds, or with the small off-sets furnished with buds at the top. The seeds should be sown in a moist bed of light earth soon after they are ripe, and they generally remain in the ground till the following spring; when the plants appear, they should be weeded and watered in a dry spring; should remain in the bed till the Michaelmas following, and then be transplanted in rows about a foot asunder, and nine inches distant in the rows, making the holes deep enough, and putting the crown of the root just under the surface of the ground; then tread the earth gently about them with your feet. The roots will be fit for use the Michaelmas following. The root is of great use as well recent as dry: it opens obstructions of the glands, helps catarrhs, and has often been found good in atrophies. It is sudorific and diuretic, and has been found of service in feverish disorders. It is likewise good in difficulty of breathing, and the moist asthma. The dose of the fresh root is from half an ounce to an ounce in decoction, and of the dry, in powder, from a drachm to two drachms. It also helps digestion, by restoring the lost tone of the stomach, and by inciding and expelling the impurities contained in the stomach and intestines. For the same reason, it is good in cholic pains proceeding from wind, and cleanses the kidneys. Spirituous liquors extract its virtues much better than the watery.

ERUCA, *Rocket*, has a white, woody, slender root, with hairy stalks that rise to a cubit, or a cubit and a half in height. The leaves are like those of mustard, they being long and narrow, with deep incisions on each side. The flowers at the top of the stalks consist of four petals, in the form of a cross, of a whitish yellow colour, with blackish streaks. The cup is hairy, from whence rises a pistil, that turns into a pod like that of mustard, but longer, with a partition in the middle. It is divided into two cells full of yellow seeds, larger than those of mustard, and not so round. The smell of this plant is strong and disagreeable, as well as the taste. There are several sorts of rocket that are planted in physic gardens, but are of no great use. They may be propagated by sowing their seeds in the spring, on a bed of light earth, where they will soon come up, and will be large enough for use in a short time; when young, they are eaten by some as a salad. This plant is said to excite the appetite and help digestion, to strengthen the stomach, and to promote urine.

ERYSIMUM, *Hedge Mustard*, has a single, white, woody root, about as thick as one's little finger, and the stalks rise to two cubits in height, which are round, firm, rough, and branched. The first leaves

are a palm in length, and are hairy, being divided into several triangular segments, of which the uppermost is the biggest. The flowers are small, and placed in rows on the branches; they consist of four yellow petals, in the form of a cross, with a hairy calyx consisting of four leaves. The pistil is changed into a pod half an inch or longer, which is horned and divided into two cells, containing many small bay hot seeds. It is accounted good in old coughs, the asthma, and other disorders of the lungs; for it not only dissolves viscid matter in the lungs and fauces, but also in the stomach and intestines, whence it is good in cholics proceeding therefrom. The dose of the leaves in decoction is a handful, and of the seeds, which are best, to a drachm. These last are good in a suppression and difficulty of urine; and some esteem them very much for their good effects against the gravel.

ESULA MINOR, *the lesser Spurge*, has a woody fibrous root, about the thickness of the little finger, which has a nauseous, acrid, pungent taste; the stalks grow to a cubit in height, and the leaves are placed very thick thereon; they are at first like those of toad flax, but afterwards grow much more slender and capillaceous. The flowers grow on the top of the branches as it were umbellated, and consist of a single petal, which is in the shape of a flower, and of a greenish colour, but divided into four segments. The pistil changes to a triangular fruit, in which are three cells containing three roundish seeds. The whole plant is full of milk, and grows by the way sides and in woods.

EUPATORIUM CANNABINUM, *Hemp Agrimony*, has a thick crooked root, with many large fibres; the stalks rise to two or three cubits high, and is strait, round, downy, of a purplish green colour; and also full of white pith. The leaves grow thick upon the stalks, and are like those of hemp, they being oblong, acuminate, and serrated on the edges. The flowers are collected into umbels on the top of the branches, and consist of many tubulous florets of a purplish colour, divided into five parts at the top, with long capillaments or double pistils, placed upon an embryo in a long, round, scaly cup. The seeds are pappous, or furnished with a long hairy down. It grows in waters, and in watery places. It is said to be hepatic, aperient, and vulnerary; and the leaves have a very bitter taste, with a great degree of pungency. It is said to be greatly prevalent against the cachexy, and Boerhaave informs us, that it is the constant medicine of the turf-diggers in Holland against scurvies, foul ulcers, and swellings of the feet, to which they are subject. Many drink it like tea several times a day; and others give three ounces of the juice. Externally, the leaves and floret tops boiled in wine are good against watery swellings.

EUPHRASIA, *Eye-bright*, has a single slender root, with a few large fibres; the stalks rise to the height of a palm and a half, and are round, a little hairy, and blackish, with leaves about a quarter of an inch long, that are roundish, smooth, though a little wrinkled, and of a dusky green. They are placed by pairs opposite to each other, without any pedicles. The flowers grow on the top of the branches, and consist of a single whitish petal, streaked with purple and yellow lines, and divided into two lips. The upper lip is upright, cloven, obtuse, crenated, and hides a few stamina; but the lower is divided into three segments, in the shape of hearts. The calyx is divided into four parts, and contains a pistil fixed in the back part of the flower, like a nail, which turns to a fruit or flat capsula a quarter of an inch long, divided into two cells full of exceeding small, oblong, ash coloured seeds. It is common in mountainous and woody places. This plant has been greatly celebrated for curing disorders of the

eyes; but it is not acknowledged at present to have any such virtues. It is said to dissolve the thick gross humours, especially of the brain. The dose of the leaves, in powder, is from one drachm to three, thrice a day.

FABA MAJOR HORTENSIS, *Windfor Beans*, has a root that is partly strait and partly creeping, with a quadrangular stalk, that is light and has several ribs. The conjugation of the leaves are not exact; for there has been sometimes three, four, five, or more, of an oblong roundish shape, that are flat, of a bluish green, veinous and smooth. The flowers proceed from the hollows where the ribs join to the stalk, and, though several of them are together, they have but one pedicle; they are papilionaceous, and are succeeded by a long pod, so well known that it needs no description. There are several sorts of beans, as the *Mazen Bean*, which is the first and best sort of early beans at present known, and are brought from a settlement of the Portuguese on the coast of Africa, near Gibronta. The seeds of this sort are much less than those of a horse-bean, and if they are sown in October, under a warm hedge or wall, and are carefully earthed up as they grow, they will be ready for the table in May. The *early Portugal Bean* differs little from the former, though it is not so well tasted; but is commonly used by gardeners for their first crop. The *small Spanish Bean* will come up soon after the former, and is much sweeter. The *Sandwich Bean* comes up soon after the *Spanish*, and is almost as large as the *Windfor bean*; but, being more hardy, is commonly sown a month sooner. The *Toker Bean* comes up about the same time with the *Sandwich*, and, as it is a great bearer as well as that, it is now much planted. The *white and black blossomed Beans* are in great esteem by some; but all these sorts are very apt to degenerate, if their seeds are not preserved with great care. The *Windfor Bean* is allowed to be the best of all, and is the largest. It is seldom planted before Christmas, because it will not bear the frost so well as any of the former. Those that are planted in October will come up about a month after, and, as soon as they are two inches above ground, the earth should be carefully drawn up with a hoe to the stems; and this must be repeated two or three times, which will protect them against the frost; but, if the winter proves very severe, it will be proper to cover them with pease haulm, fern, or some other light covering, which must be taken off in mild weather. The *Horse Bean* delights in a strong moist soil, that lies quite open; for they never thrive well on dry warm land, or in small inclosures. The season for sowing these beans is from the latter end of February to the beginning of April, according to the nature of the soil.

With regard to the nature and faculty of beans, authors are not agreed; but the common opinion is, that they are windy and hard of digestion. Some have doubted the nourishing quality of beans; but innumerable experiments have established their credit beyond all contradiction. The meal of dried beans is reckoned among one of the four resolvent meals, and is used by some as a cataplasm, boiled in milk, to resolve and suppurate tumours. The water distilled from the flowers is looked upon as a cosmetic, and is still in use, to take away spots on the face.

FILIPENDULA, *Drop-wort*, has a fleshy blackish root, which terminates in several branches or fibres, and near the ends there are knobs, or bulbs, somewhat longer than an olive. There are several leaves that proceed from the root, which are finely cut into narrow segments, and are of a blackish green colour; the stalk is generally single, erect, and about a foot in height. It is streaked, branched, and has but few leaves, and the flowers grow on the top of the

the stalks in umbels; they are rosaceous, consist of six white petals, which are a little reddish on the outside; there are many stamina and red apices, placed in a cup consisting of a single leaf that has a great number of points. The pistil turns into a globous fruit, composed of eleven or twelve rough flat seeds, and are so placed together in a head, resembling a tub. It grows wild in many parts of England, upon heaths and commons. The leaves of drop-wort have an astringent, saltish, glutinous taste; the whole plant is said to incise and attenuate gross humours, and to carry them off by urine. The dose of the root, in powder, is a drachm, and some have looked upon it as a secret to cure the bloody flux, when given in wine or the yolk of an egg.

FOENICULUM VULGARE, *common Fennel*, has a perennial root, and is about as thick as one's finger; it is strait, white, and has a sweetish aromatic taste; the stalk rises to the height of three cubits, which is strait, round, streaked, geniculated, smooth, slender, and covered with a greenish rind; it is full of a spongy white pith, and divided into many twigs towards the top. The pedicles surround the stalk and branches like a sheath, from whence proceed the leaves, that are divided into slender segments, or capillaceous jaggs, of a dark greenish colour, with a sweet taste and smell. It is an umbelliferous plant; for the flowers grow in umbels at the ends of the branches, and are rosaceous, and consist of five yellow petals; the calyx turns to a fruit composed of two oblong thickish seeds, gibbous and streaked on one side, and plain on the other.

FOENICULUM DULCE, *sweet Fennel*, differs little from the former, only the stalk is not so high nor so thick, and the leaves are less; but the seeds are larger, streaked, whitish, more sweet, and less acrid. They are propagated by sowing the seeds soon after they are ripe, and when the plants are come up, they should either be transplanted, or hoed out, to the distance of sixteen or eighteen inches each way. The seeds must not be suffered to shed on the ground; for then they will overrun every thing that grows near them. The Sweet Fennel is annual, and must be sown in March, in a warm soil and open situation. They should be hoed out at the distance of ten inches from each other, and in August the seeds will be ripe; soon after which the roots will decay. The best seeds are those that are brought from abroad, which are so cheap, that it is not worth cultivating here. These plants are diuretic, aperient, sudorific, stomachic, pectoral, and febrifuge. The root is numbered among the five aperient roots. The powder of the seeds is given from half a drachm to a drachm, with sugar in wine. The whole plant, as well as its seeds, is greatly cried up against dimness of the eye sight, especially for those that have hurt their eyes by reading in the night time; for which purpose the powder of the seeds should be taken every morning fasting with sugar. The essential oil is a great carminative, and from six to twelve drops, on a lump of sugar, are a dose. It is good against the flatulent cholic, and helps digestion. The use of green fennel with fish is very well known.

FOENUM GRÆCUM, *Fennugreek*, has a slender, white, single, woody root, from whence proceeds a stalk, that rises to the height of half a cubit, which is slender, green, hollow, and divided into wings or branches; and there are three leaves growing upon one pedicle, like those of meadow trefoil; they are slightly serrated on the edges, and are sometimes more broad than long; they are green on the upper side, and of an ash colour below. The flowers proceed from the places where the pedicles join to the stalk, and are papilionaceous and whitish, changing to pods a palm, or a palm

and a half in length; they are flattish, a little crooked, narrow and slender, with a long, light, slender, sword-like point; they contain many seeds that are yellowish, and have no very agreeable smell. They have a mucilaginous taste, and the meal made therewith softens, digests, ripens, discusses tumours, and eases pains.

FRAGARIA, the *Strawberry plant*, has a perennial reddish root, consisting of many capillaceous fibres, of an astringent taste. The pedicles are a palm in length, and are slender, hairy, and branched at the top, some of which sustain leaves, and others flowers; there are three leaves on every pedicle that resemble those of cinquefoil, which are veinous, hairy, serrated on the edges, of a greenish colour above, but whiter below. There are four or five flowers upon one pedicle, that are rosaceous, and consist of five whitish petals, with as many short stamina sustaining yellow apices. The pistil is globous, and placed in a cup composed of ten parts or segments. The pistil turns to a globous fruit, which when ripe is red, though sometimes whitish, and is very well known. It grows wild in shady places, and is cultivated in gardens. They are of several sorts, as the *common*, or *wood Strawberry*; the *common Strawberry with white fruit*; the *Hautboy*; the *Virginian Strawberry with scarlet fruit*; the *large Chili Strawberry*; the *globe Hautboy*; and the *Strawberry with a small greenish white fruit*. The first and second sorts are found wild in the woods, from whence they are transplanted into gardens, where the fruit is improved, the best season for which is early in the spring, if the weather proves moderate. The best soil for these plants is fresh loam, not over rich, and the ground should be well dug. It should be made quite level, and marked out into beds about three feet and a half wide, leaving a path between each bed two feet broad. In these beds may be planted four rows, and the plants should be at least eight inches asunder in the rows, when they are designed for the wood strawberry, for the others will require more room. If it is a dry spring, they should be well watered, otherwise there will be no fruit; and the beds must be well weeded from time to time. They will not continue to bear well above three years. Strawberries are cooling, quench thirst, loosen the belly, promote urine, and expel small gravel. They should be eaten with cream, because with milk they curdle upon the stomach. The roots and leaves are diuretic and aperient, for which reason they are recommended by some in obstructions of the viscera, and the jaundice.

FUNGUS CAMPESTRIS ESCULENTUS VULGATISSIMUS, the *common esculent Mushroom*, when it first appears is globous, after which it expands by little and little, and underneath there are reddish plates placed near together all round; on the upper part it is smooth and white; the flesh is extremely white, and it has a short thick pedicle. The smell and taste are good when it first appears out of the earth, and it should be gathered before it is expanded; for when it is older, it has a stronger smell, and is of a brownish colour. It grows almost every where in woods and pasture grounds after rain. They have now a method of cultivating it in gardens; in order for which some are to be sought for in August and September, and having found them, you must open the ground about the roots, where you will often find the earth full of small white knobs, which are off-sets, or young mushrooms. These should be carefully gathered, preserving them in lumps with the earth about them. The beds to receive this spawn should be made with dung, in which there is plenty of salts. These beds should be made on dry ground, and the dung should be laid upon the surface; the breadth should be two feet and a half from the bottom, and the

the length in proportion to the quantity of mushrooms desired. The dung should be a foot thick, and covered with about four inches of strong earth; then lay more dung ten inches thick; and then another layer of earth, still contracting the sides of the bed so as to form it like the ridge of a house. This done, it should be covered with litter, or old thatch, to keep out the wet, and to prevent its drying. It must remain thus eight or ten days, and the spawn, which should be always kept dry till it is used, should be thrust into the bed after the covering is taken off, and another of earth put on, about an inch thick. It should be laid in lumps two or three inches asunder, and then covered with the same light earth half an inch thick, over which the litter must be laid again to keep out the wet. The spring and autumn are the best seasons for this purpose; for then the mushrooms will appear in about a month. The bed will continue good for several months, and produce great quantities of mushrooms; and they will likewise supply you with fresh spawn, which must be laid up in a dry place till the proper season.

GALEGA, *Goats Rue*, has slender, woody, white, fibrous, perennial roots, and stalks that rise to the height of two cubits and upwards, which are light, streaked, and divided into several branches. The leaves are winged like those of vetches, and there is always a single one at the end; but they are longer and terminate in a soft thorn. The flowers are of the papilionaceous kind, and are white, or of a whitish purple colour. It consists of the standard, the wings, and the keel; and the pistil becomes a long taper pod, containing oblong seeds, in the shape of a kidney. It grows wild in Italy, but with us is cultivated in gardens. This may be propagated either from the seeds, or by parting of their roots. The best season for sowing the seeds is in the beginning of March, in a light soil, and in an open situation; when the plants are come up, they should be well weeded, and, if they are too close, some of them should be pulled up, leaving the rest at eight or nine inches distant from each other. The next year these plants will flower, and produce ripe seeds. The roots may be parted into small heads, in order for their increase in autumn. It is accounted a great alexipharmic, and has been commended in pestilential fevers, and for the epilepsy in children. The herb may be eaten either crude or boiled, or a spoonful of the juice may be given for a dose. Some look upon this herb as a great preservative against the plague, and likewise affirm it to be good to kill worms.

GALEOPSIS, *dead Nettle*, or *stinking dead Nettle*, has a creeping root, with slender fibres proceeding from the joints; the stalks rise to the height of a cubit, or a cubit and a half, and are square, hairy, light, and branched. The leaves are placed by pairs opposite to each other, and are somewhat broader than the common nettle, but sharp at the points, and serrated on the edges; they are covered with a sort of down, and on the tops of the stalks and branches there are spikes of flowers, which consist of a single petal, which is labiated, and the upper lip is hollow like a spoon; but the under one is divided into three segments, of which the middlemost is the largest; the stamina, as well as the flower, are of a purple colour, with a strong disagreeable smell. The cup of the flower is in the shape of a funnel, divided into five parts, the pistil is fixed to the back part of the flower like a nail, and is attended with four embryoes, that turn to as many oblong seeds, which when ripe are black. It is said to be vulnerary, and that when the fresh leaves are bruised and laid upon old ulcers it will heal them in a short time.

GALEOPSIS ANGUSTIFOLIA FOETIDA,

narrow leaved stinking dead Nettle, differs very little from the former in either form or virtues.

GALLIUM LUTEUM, *Ladies Bed-Straw*, or *Cheese Rennet*, has a small, creeping, slender, woody, brown root, from which square stalks proceed to a cubit in height. The leaves are placed at the joints of the stalk, in a radiated form, and are five or six in number; they are long, narrow, slender, soft, and of a darkish green colour. From every joint proceed two branches, on which are flowers consisting of a single petal, in the form of a bell, which is expanded towards the upper part, and divided into four segments. The calyx turns to fruit composed of two dry roundish seeds. Some of the modern physicians commend it against the epilepsy, and give a drachm of the powder for a dose, of the juice four ounces, and a handful in decoction.

GENISTA, *Broom*, is a shrub that sometimes grows to be as tall as a man; the root is hard, woody, tough, yellow, and furnished with crooked fibres. The stalks are slender, woody, and many twigs proceed from them, that are angular, green, tough, and about them there are small, hairy, dark green leaves, sometimes growing three together, and sometimes single. The flowers that grow thereon are of a beautiful yellow, and papilionaceous, with crooked stamina, and saffron coloured apices; to which succeed flat broad pods, which are blackish when ripe, and full of flat, hard, reddish seeds in the shape of a kidney. It grows in barren grounds all over England. There are several sorts of these plants cultivated in gardens, and they may be propagated by seeds, which should be sown on a moderate hot bed in the spring; as soon as the plants are strong enough to remove, they should each be set in a pot filled with light earth, and it will be safest to plunge the tender kinds of them into a very temperate hot bed, where they should be shaded till they have taken root; then they should be inured to the open air by degrees; but in winter they should be placed in a good green-house, and in mild weather they should have as much free air as possible. Several of them are useful in dying, and therefore they have the name of dyers weeds. Common broom is intensely bitter, and the leaves, tops, and branches, decocted in wine or water, are useful in dropries, and in all obstructions of the kidneys and bladder; for they partly purge off the serous humours by stool, and partly by urine. A drachm and a half of the seeds will purge very briskly, and sometimes vomit. In some places they mix the flowers with sallads, without any bad effects.

GERANIUM SANGUINEUM, *bloody Cranes bill*, has a red thick root, and many long thickish appendages, with a few fibres, and every year new shoots proceed from the roots. It has several stalks that arise to a cubit in height, that are reddish, hairy, geniculated, and divided into many wings. A pair of leaves proceed from every knot, which are divided into several parts, and are hairy and green above, but hoary below; there are oblong pedicles that proceed from their upper wings, which sustain a single flower, and is the largest of any that belong to this kind of plants; it is of a beautiful red colour, composed of five petals of the same colour, and ten small stamina, that are supported by five hairy, greenish, small leaves. The bill is in the shape of a pentagon, and contains swelling tailed seeds, which are thrown out by the twisting of the bill. There is another Geranium, called *Geranium Batrachoides*, *Crow-foot Cranes-bill* with a blue flower, which has all the characters of the former, except the colour. Bloody cranes-bill is styptic, and has been used in vulnerary decoctions, or broths. Doves foot cranes-bill

bill has the same virtues as the former, and a syrup made of the juice is commended against the bloody flux.

GROSSULARIA, *the common Gooseberry*, is a shrub, and has a woody root; it is sometimes two cubits high or higher, and is full of branches, with a bark, when full grown, of a purplish colour, and there are long sharp thorns at the rise of the leaves, two or three of which are placed together. These have short pedicles, and are of the breadth of a man's nail, or somewhat broader, and are lacinated or jagged. The flowers are small, and several of them proceed together from the same tubercle as the leaves, and have a very short, hairy, reddish pedicle; they are rosaceous, consisting of five petals of an herbaceous whitish colour, with a calyx consisting of a single leaf in the shape of a basin, and divided into five reddish segments bending downwards, with five stamina and a greenish pistil. The hinder part of the calyx turns into a globous berry universally known. There are several sorts of gooseberries, besides this, cultivated in gardens, as the *large manured Gooseberry*, the *red hairy*, the *large white Dutch*, the *large amber*, the *large green*, the *large red*, the *yellow leaved*, and the *striped leaved Gooseberry*. These are propagated by suckers taken from the old plants, or by cuttings, which is best. The best season for planting them is in autumn, just before their leaves begin to fall, always taking the handsomest shoots, that proceed from branches that bear the greatest quantity of fruit. They should be six or eight inches long, and planted in a border of light earth, about three inches deep, and exposed to the morning sun, observing to water them a little when the weather proves dry; when they begin to grow, the under shoots should be rubbed off, leaving only the uppermost and strongest. In October following, these plants will be fit to remove to an open spot of fresh earth, in which place they may remain for a year, and all the lateral shoots should be taken off, so as to leave the stem clear about a foot above the surface of the earth. In a year's time they may be removed to the place where they are to remain. The best season for transplanting them is in October. As to their physical virtues, nothing need to be said about them, they being only eaten for pleasure, or used to make gooseberry wine.

HEDERA TERRESTIS, *Ground Ivy*, has a creeping fibrous root, with slender, quadrangular, reddish, hairy stalks, on which the leaves are placed by pairs on long pedicles; they are roundish, an inch broad, hairy, and crenated; the flowers grow on the top of the stalks, and consist of a labiated single petal. The upper lip is divided into two segments, that turn back to the sides, and the lower into four segments, and the tube is variegated within with deep purple spots and lines, and the opening of the mouth is covered with a sort of white down. The pistil is slender and forked, and the calyx is oblong, narrow, streaked, and divided on the edges into five short segments, which, when the flower decays, has a swelling belly, containing four oblong, roundish, smooth seeds. The whole plant is opening, cleansing, discutient and vulnerary. It is excellent for wounds and ulcers of the viscera, and is good in the beginning of a consumption. The dose of the tops, reduced to powder, is from half a drachm to a drachm twice a day. It is also good against the gravel as well as the cholic. Ray affirms, that the powder, snuffed up the nose, will cure a violent headache. It is common about London to infuse the dried leaves in malt liquor, and then it goes by the name of gill-ale.

HEDERA ARBOREA, *common Ivy*, is well known in most parts of England, and sometimes grows very large, forming a sort of a tree; at other times fastening itself to trees, walls, houses, and churches. It

sends forth roots or fibres from its branches, by which it fastens itself to whatever is near it, from which it receives a great part of its nourishment; the leaves are angular, and the flowers consist of six leaves, that are succeeded by black berries, which grow in round bunches, each of which contains four seeds. The leaves are said to be heating, drying, and subastringent; but are seldom given inwardly, because they are offensive to the nerves. The berries purge upwards and downwards, and the leaves applied to corns will take them away in a short time. The gum has been treated of in the former part.

HELIANTHEMUM TUBEROSUM, *see HELIANTHEMUM INDICUM TUBEROSUM*, *the Potatoe plant*. One stalk or more rises from each root, which is green, streaked, rough, hairy, and attains the length of twelve feet or upwards, full of a white spongy pith. The leaves are many, placed in no order, and from the bottom to the top; are greenish, rough, broad, and acuminate like those of the common sun-flower, but not so much wrinkled nor so broad. The stalks soon after their rise are branched, and the leaves decrease in size from the bottom to the top. The flowers grow on the top of the stalks, and are of the size of marygolds, and radiated. The disk consists of many yellow florets, with a crown composed of twelve or thirteen streaked pointed gold coloured semi-florets, placed on embryos in a scaly villous cup. The embryos turn into small seeds, and the stalk emits several slender creeping roots, that spread themselves on all sides, between which there are many tuberoses roots, sometimes adhering to the chief root, and sometimes connected to long fibres a foot distant from them. One root will produce thirty, forty, fifty, or more potatoes. These are reddish or whitish without, and consist of a whitish substance, or flesh, with a sweetish taste, and are often bigger than a man's fist. They continue in the ground all the winter, and the next year they spring again. This plant has been greatly propagated in England for more than fifty years past; for, though it was brought from America in 1623, it was not much cultivated before, because they were then thought only fit for poor people; but now they are in general esteem. It is propagated here by the roots, which if large are cut into pieces, preserving a bud or eye in each; but the best method is to plant the finest roots entire, allowing them a pretty large space of ground between the rows, as also each root, and then those that are produced will be large the following autumn. A light sandy loam is best, if not too dry or moist; it should be well ploughed two or three times, and the deeper the better. They are very nourishing, abate the acrimony of the blood and juices, and are consequently good in disorders of the breast. Some people in France eat them raw with salt and pepper.

HERNIARIA GLABRA, *smooth Rupture-wort*, and **HERNIARIA HIRSHUTA**, *hairy Rupture-wort*, are both small herbs that lie on the ground, and are divided into several branches that proceed from a small root, which descends directly downwards; the stalks are round, reddish, and full of joints, at each of which there are very small leaves, placed in pairs opposite to each other, less than those of dodder, and of a yellowish green colour. From the same joints there proceed many flowers that are small, yellowish or white, without petals; but there are many stamina. The pistil turns into a very shining small black seed, contained in an oblong streaked capsula, that was the calyx of the flower. It is a very mild astringent, and is likely to be of some service in a flaccid state of the viscera. The dose of this herb, in powder, is a drachm; and, when a handful of the herb is steeped in a pint of

wine

wine or water, five or six ounces may be given at a time.

HORMINUM, *Clary*, has a single, woody, brown root, with many fibres, from whence arises a stalk to the height of two cubits, about as thick as one's finger, quadrangular, hairy, geniculated, and divided into branches; it is full of a white pith, and the leaves are set by pairs opposite to each other, which are hoary, wrinkled, of a roundish oblong shape, a span in length, and half a span broad, terminating in a point, and a little dentated or crenated on the edges; they are a little hairy, and gradually decrease in size from the bottom to the top. The flowers proceed from the places where they join the stalk, and consist of a labiated single petal, whose upper lip is long and falcated, with a slender crooked pistil, cloven at the top, and attended with four embryos; there are two stamina with oblong apices, that are hid thereby; but the lower lip is divided into three segments, the middlemost of which is hollow like a spoon. The calyx is tubulated, streaked, glutinous to the touch, and divided into five small spines, whereof three arise above the flower, and the other two are below. The embryos at the bottom of the calyx, when they are ripe, turn to four large roundish seeds, gibbous on one side, angular on the other, slippery, and bright, and of a reddish colour. It is found dry on many banks in various parts of England; but there are many other sorts that are cultivated in gardens. The leaves and flowers are given in decoction in water and wine, in some cases peculiar to women. It is usually drank as tea.

HYOSCYAMUS NIGER VULGARIS, *black Henbane*, has a thick, wrinkled, long root, divided into many parts, brown without, and white within, with broad, soft, hairy leaves, of a light green colour, and deeply cut on the edges; they are placed in an irregular order, or branched, thick, roundish, hairy stalks, that arise to a cubit in height. There are long rows of flowers on the stalk, that consist of a single petal in the shape of a funnel, with a short cylindraceous tube, and is divided into five obtuse segments, of a yellowish colour on the edges with purplish veins; but the middle is of a blackish purple, with five short purple stamina, and thick oblong apices; the pistil is long and white, with a round apex, and the calyx is hairy, oblong, and consists of a single leaf, having stiff acuminate teeth on the edges, of which there are five in number; this turns to a fruit in the shape of a pot with a cover to it, and is divided into two cells, containing several ash coloured, small, roundish, wrinkled, flat seeds. The whole plant has a disagreeable smell, that renders the head heavy and produces sleepiness. It is very common in England, growing on the sides of banks and old dunghills every where.

HYOSCYAMUS ALBUS, *white Henbane*, differs from the former in having softer and lesser leaves, covered with a greater plenty of white down, as also whiter seeds. They have been only used externally to ease pains, and to abate the acrimony of the humours; however, it is not safe used any way, for it produces extreme sleepiness, and strange fantastical dreams.

HYPERICUM, *St. John's-wort*, has a woody, fibrous, yellowish root, with many stiff, woody, round, reddish, branched stalks, that rise to the height of a cubit or higher; the leaves are placed thereon by pairs opposite to each other, but without pedicels; they are above half an inch long, a quarter of an inch broad, smooth, and with nerves that run throughout the whole length; when they are held up to the sun, they seem to be perforated with a great number of holes, which are nothing else but vesicles full of an oily juice. The flowers grow on the extremities of the branches, and are rosaceous, consisting of five gold coloured petals, in the mid-

dle of which there are a great number of capillary stamina, with golden apices. The cup is composed of five leaves, contains a thick pistil divided into three parts, and placed in the center of the flower; turns to a capsula divided into three cells, containing very small, oblong, brownish black seeds. Both the flowers, and the head full of seeds, when rubbed, yield a red juice. The leaves have a saltish, bitterish, styptic taste, and the whole plant is accounted the principal of the vulnerary kind; for which reason it is recommended to cure wounds both inwardly and outwardly, as well as for spitting and pissing of blood. The dose of the floret tops, in decoction or infusion, is a handful, and sometimes the leaves and seeds are prescribed to a drachm. *St. John's-wort*, applied outwardly, is an excellent vulnerary, and cures wounds, bruises, and ulcers.

HYSSOPUS, *Hyssop*, has a woody, hard, fibrous root, about as thick as one's finger, with stalks that grow to the height of a cubit, which are branched and brittle. The leaves are placed by pairs opposite to each other, and are from an inch to an inch and a half in length, and only a sixth part of an inch broad. They are sharp, smooth, of a dusky green, with an acrid taste, and a sweet smell. The flowers grow at the tops of the stalks, and are large, blue, labiated, and consist of a single petal, whose upper lip is upright, roundish, and divided into two segments, and the lower into three; the middlemost of which is hollowed like a spoon, having a double part, and is somewhat winged. There are four oblong blue stamina, with small dark blue apices. The flower cup is long, streaked, and divided into six segments, from which the pistil arises, fixed in the back part of the flower like a nail, attended with four embryos, which turn into as many small, roundish, brown seeds, contained in a capsula that was the cup of the flower. Hyssop is propagated either by seeds or cuttings, and must be sown in March, on a bed of light sandy soil, and when they are come up they should be transplanted out to the places where they are to remain, placing them at least a foot asunder every way. The cuttings should be planted in April, or May, on a border where they may be defended from the violent heat of the sun, and being frequently watered they will take root in two months, after which they may be transplanted where they are to continue. Hyssop has an acrid taste, and a strong aromatic smell. It strengthens the stomach, helps digestion, incides viscid mucus of the lungs, and promotes expectoration: whence some account it a specific in the moist asthma. It is given in infusion, or decoction, in water, wine, or ale, from half a handful to a handful and a half.

JASMIMUM, *the Jessamine tree*, has a pinnated leaf, and the cup of the flower consists of a single leaf divided into five segments; the flower also consists of a single leaf, in the shape of a funnel, and divided into five segments, with small apices; the embryo is roundish, with a pistil like a thread, of the length of the stamina, with a double apex. The embryo turns to an oval smooth berry, divided into two cells, in each of which there is a large oblong oval seed, wrapped up in a membrane, convex on one side, and flat on the other. It is very common in most English gardens, where it is cultivated for the sweetness of the flowers, and is propagated by laying down the tender branches in the spring. In the succeeding spring, they will be rooted strong enough to be transplanted; and it must be placed against a wall, or pales, where the flexible branches may be supported. It was formerly in some esteem for its medicinal virtues, but is now out of use.

IBERIS, *Sciatica Cresses*, whose flower consists of four unequal parts, that are vertically oval, blunt, and open, with oblong erect heels, of which the outer ones are by far the greatest, and the innermost least

and

and bent back. The flower cup has four leaves, vertically oval, concave, open, small, equal, and soon fall off; the stamina are six subulated erect filaments, of which the two lateral are the shortest, and the apices are roundish. The germen, or embryo, is roundish and flat, and the stile, or pistil, single and short, with a blunt apex, and turns to a small roundish flat pod, consisting of two cells, in each of which there is an oval seed. It has the same virtues as water cresses, and, when bruised together with salt and hog's-lard, makes an excellent cataplasm against the hyp-gout. It is only to be met with in botanic gardens.

JUGLANS, the *Walnut-tree*, is very large, and stands upon many very long roots. The trunk, or stem, is very thick, insomuch that in some countries it is three cubits in circumference, with many branches at the top. The bark is thick, of a greenish ash colour, and smooth; but, when it grows old, is full of chinks. The wood is well known for making or covering curious cabinets, chests of drawers, and the like, and is greatly esteemed for its beautiful variegations. The leaves are disposed in wings, and there are five, six, or seven adhering to one rib, consisting of conjugations, with a single leaf at the end. At first they are tender, reddish, and have a sweet smell; but, when they are full grown, they are a palm and a half in length, and almost a palm broad, and pointed at both ends, with veins that run from the middle nerve, and are smooth, of a beautiful green, with the smell of laurel, but much stronger, and of an astringent taste. The smell of the walnut is at first pulpy and white, and of a bitter acrid taste; but, as it ripens, it becomes woody, and divides into two parts, in which is a kernel with four lobes, and covered with a thin skin. The taste is sweet and agreeable when fresh; but, when dry, it becomes oily and rancid. The skin is bitter, acrid, and when the kernels are fresh may be easily taken off. Walnuts are of different species, as the *largest Walnut*, the *thin shelled*, the *hard shelled*, the *late ripe*, the *black Virginia*, the *black Virginia with long fruit*, the *Hickary*, the *shag bark*, the *small Hickary* or *white Virginia*, and the *least Virginia Walnut*. The four first sorts are propagated every where in England, and the first and second are preferred for their large nuts. The Virginian sorts are only rarities, but are worth cultivating for their timber. All sorts of walnuts, that are propagated for timber, should be sown in places where they are to remain, but such as are designed to produce good fruit, are greatly mended by transplantation. The nuts should be preserved in their outer covers till February, when they should be planted in lines at the distance they are intended to remain. When these trees are transplanted, neither the roots nor branches should be pruned. The best season for this is as soon as the leaves begin to decay, and this may be done till they are eight or ten years old. They delight in a firm, rich, loamy soil, or such as is inclinable to chalk or marl. They should be placed forty feet asunder, when any regard is had to the fruit; but, when for timber, they must stand near each other, because it promotes their upright growth.

The inner bark of the Walnut tree is a strong vomit, but the catkins are more gentle, and have been given in powder from half a drachm to a drachm. Some account the leaves an excellent cataplasm against the gout, when they are placed while green in a glazed earthen vessel one layer upon another. The juice of the root is a violent purge, unless it proceeds from the wounded root in February, and then it is recommended in chronic diseases, especially in the gout, gravel, and head-ach; for it greatly promotes urine. The green outer rind is astringent, and is said by some, when recent, to have an emetic faculty. The kernels are best while

fresh, because when old they grow rancid, as was before observed. The membrane, or pith, powdered and given to a drachm, is good in the cholic, and by some esteemed as a secret against fluxes of the belly.

JUNIPERIS, the *Juniper tree*, is a shrub well known in all parts of Europe, and grows in woods and mountainous places. The stem rises sometimes to the height of a man, but is slender, and has many branches, with a rough reddish bark. The wood is pretty firm and reddish, especially when it is dry, with an agreeable resinous smell. The leaves are very sharp, exceeding narrow, and seldom above an inch in length, but often shorter; they are stiff, pungent, always green, and several of them grow together, with some distance between. The catkins appear in April and May, in the places where the leaves join to the stalk, and are a quarter of an inch long, variegated with purple and saffron colours; they consist of several scales, whose lower part is furnished with three or four vesicles, less than poppy seeds, which are full of a fine golden coloured powder. This is the male flower, but the cup of the female flower is very small, adhering to the embryo, and divided into three parts, and there are three stiff sharp petals. The pistil is divided into three single styles, with each a single apex; and they turn to a fleshy roundish berry, containing three seeds each, convex on one side and angular on the other. Some trees produce only the male or female flowers and others both. The berries do not grow ripe till the second year, and there are some that are three years old. The berries are resolving, discutient, attenuating, heating, abstergent, and strengthening. They are good in a cold stomach, discuss wind, help digestion, promote urine, and ease the pains of the cholic. They are likewise good against coughs, and in the moist asthma; they restore the fluidity of the blood, and promote sweat. The dose is a drachm, which may be either eaten, or their infusion may be drank in the manner of tea, before meals, to help digestion. Many will eat a pugil at a time, without any manner of harm, and found they have not only brought away gravel but small stones.

LACTUCA SATIVA NON CAPITATA, common garden Lettuce, has a long thick root with many fibres, and oblong, broad, wrinkled, smooth, palish green leaves, which are very agreeable while young, but bitterish when old. When it shoots up to a stalk, it is strong, thick, round, and grows to the height of a cubit and a half and upwards. The flowers are collected in a sort of umbel, and the flower cup is imbricated, consists of many acuminate scales, and is of an oblong oval shape. The flowers consist of many yellow semi-florets, with five very short capillary filaments, on which are cylindrical tubulated apices. The pistil is like a thread of the length of the stamina, on which are two apices bent backwards, to which succeed small seeds, sharp at both ends, furnished with down, and of an ash colour.

LACTUCA SATIVA CAPITATA, Cabbage Lettuce, has shorter and broader leaves than the former, which are soon collected into a round head; the seeds are like the former but black. Besides these, there are the *Silicia Lettuce*, the *Dutch brown*, the *Aleppo*, the *imperial*, the *green capuchin*, the *upright white Cos*, the *black Cos*, the *white Cos*, the *red Capuchin*, the *Roman*, the *prince*, the *royal*, and the *Egyptian Cos Lettuce*. The first of these is commonly sown for cutting very young, with other small salad herbs. They may be sown any time in the year, but in winter it should be under glasses. The Cabbage Lettuce may be also sown at different times of the year, particularly in February for the first crop, in an open warm spot of ground, and when they

they are come up they should be thinned to the distance of ten inches every way. The seeds, that are sown for the succeeding crop, should be in a shady moist situation, but not under trees. Those for the last crop should be sown in August, on a good light soil, and in a warm situation. In the beginning of October, they should be transplanted into warm borders, where, if the winter is not very severe, they will stand very well. Most of the other sorts may be sown in March, upon a warm light soil, and in an open situation, and afterwards in April, May, and June; and in August, those that are intended for the winter, which should be transplanted either under glasses, or in beds arched over with hoops, in order to be covered over in the winter.

The *Roman Lettuce* has longer and narrower leaves than the two first, and not so wrinkled, and underneath, on the sides of the rib, there are small prickles. Some, as these lettuces grow, tie the leaves together, by which means they become exceeding white and tender; and then they are thought by many to excel all other kinds. In general lettuces are easy of digestion, abate the acrimony of the humours, and quench thirst; for which reason they are frequently used in the summer season. Many take them to be anodyne, and to procure sleep, which is done not by any narcotic quality, but by relaxing the fibres, and temperating the heat of the viscera. They are good in dry constitutions, and help those that are costive.

LAPATHUM MAJUS, *five RHABBARUM MONACHORUM*, *Monks Rhubarb*, has a long thick root, from which proceed many fibres, and is brown without, but within of a deep saffron colour. The stalk, which sometimes rises to the height of a man, is reddish, streaked, and divided into many branches at the top; the leaves are from a foot to a foot and a half long, and are broad, acuminate, firm, smooth, of a darkish green, but not hard and stiff; the edges are sometimes a little turned up, but they are even, and have long pedicles. The flowers grow in long rows on the stalks, and are like those of sorrel, to which succeed angular seeds contained in membranaceous cells, and are like those of the dock; they are said to purge bile gently, to be a powerful astringent, and to open obstructions of the liver; whence the powder or decoction is given in some fluxes of the belly. The dose, in powder, is from a drachm to half an ounce, when it is designed to purge.

LAPATHUM SANGUINEUM, *Blood-wort*, is not unlike the garden dock, but may be easily distinguished from all other docks by its blood-red juice, and by its numerous nerves; the juice first tinges the hands with a purple colour, which afterwards changes to blue. The leaves are eaten by some after they are boiled, and have likewise been prescribed in emollient and cooling broths. The seed is strengthening, astringent, and anodyne, and the powder of them is given from half a drachm to a drachm to stop uterine fluxes, and those of the belly attended with gripes.

LAPATHUM ROTUNDIFOLIUM, *five LAPATHUM MONTANUM*, *bastard Monks Rhubarb*, has a long branched root, and each of the branches are as thick as a man's thumb; they are wrinkled and fibrous, and of a deep yellow, with a bitter taste. The stalk sometimes rises to three cubits high, and is hollow, furrowed, reddish, and has many wings. The leaves are like those of burdock, and are remarkably round, smooth, and of a yellowish green, with a reddish streaked pedicle. There are several flowers placed upon the stalks, consisting of many yellow stamina and apices, with a calyx composed of six leaves, to which succeed triangular reddish seeds. The root is variegated with yellow and red, like true rhubarb, and some pretend it has the same virtues, but weaker. Its dose, in powder, is to two

drachms. When the roots are taken fresh out of the ground, and dried in the shade, they are used in fomentations, liniments, and ointments against diseases of the skin.

LAPATHUM AQUATICUM, *five HYDROLAPATHUM*, *great water Dock*, has a more fibrous root than the former, which is black without, and of the colour of box within. The stalks rise to the height of two or three cubits, and the flowers and seeds are like the former, but larger; the leaves are broad, long, and somewhat like those of monks rhubarb; but are almost a cubit and a half in length, terminating in a sharp point, with the edges slightly curled. It grows in marshy places, and by the sides of ditches. The leaves of this plant are styptic and bitterish, and the taste of the root is very bitter. The root is a laxative, opens obstructions of the viscera, and is good in diseases of the skin. The fresh root is given from an ounce to two ounces in decoction, and in substance, when dry, from a drachm to two drachms.

LAPATHUM SPINACIA DICTUM, *Spinage*, of which there are three kinds, the *common Spinage*, the *common barren Spinage*, and the *common Spinage with a capsula of the seed not prickly*.

The *common Spinage*, or the *common prickly narrow leaved Spinage*, has a slender, white, single root, with a few fibres, and the stalks, which rise to the height of a foot, are fistulous, round, streaked, divided into wings, and have long pedicles. The leaves at the bottom are sometimes jagged on both sides, with sharp points; but those on the top have only two processes, like ears at the base, with a fine sort of meal thereon. The flowers are placed on the stalks from the middle to the top, and are without petals; but they have many stamina and small herbaceous, or purplish small apices, placed in a cup, consisting of four leaves. Those that arise from the wings of the leaves, or the female plants, have no petals, but only greenish embryos, with four whitish filaments, that turn to a pretty large fruit, or capsula, with prickles adhering thereto. It is planted in gardens.

Common smooth seeded Spinage, with broader leaves, has much larger leaves than the male and barren or female kinds, and are also rounder, and the capsula of the seeds is quite smooth and of an ash colour. These are common kitchen herbs throughout Europe. In general, they are said to temperate acrid bilious humours in the first passages; but, as they are watery, some correct them with salt, pepper, and other spices. They do not yield much nourishment, but are not unwholesome, and generally keep the body open. The seeds of the male and barren kinds should be sown in an open spot of ground in the beginning of August, when it is likely to rain; when the plants are come up, they should be thinned, leaving them three or four inches asunder; and this should always be done in dry weather. In October they will be fit for use, and then you should only crop off the largest leaves, leaving those in the center of the plants to grow bigger. Thus you may continue cropping it all the winter and spring, till the young spinage, sown in the spring, is large enough for use, which is commonly in April. The other sort is likewise to be sown in an open spot of ground. The plants should be left about three inches asunder, and, when they are grown large enough to meet, part may be taken up for use, that so the plants, being thinned, may have room to spread; this may be repeated twice, and at the last, they should be eight or ten inches asunder.

LAVANDULA LATIFOLIA, *greater, or broad leaved Lavender*, has a woody root divided into fibres, and the plant consists of many thick, slender, quadrangular, geniculated branches, that rise to the height of a cubit and a half, or two cubits. The

lower leaves are thickly placed, and irregular; but the upper are set by pairs alternately, and are fleshy, hoary, and oblong, with a nerve running along the middle; as also a strong agreeable smell, and a bitterish taste. It is a verticillated plant, and the flowers grow on the tops of the branches in spikes, which are blue, labiated, and consist of a single petal; the upper lip is upright, roundish, and cloven into two parts, and the lower into three, that are almost equal. The calyx is oblong and narrow, and from it rises a pistil fixed in the back part of the flower like a nail, and attended with four embryos, that turn to as many seeds, contained in a capsula, that was the cup of the flower.

LAVANDULA ANGUSTIFOLIA, *narrow leaved Lavender*, is in all respects like the former, only it is less, shorter, and the leaves are lesser, narrower, and not so long or white, nor is the smell so strong; but the flowers are larger. Sometimes they both vary in having white flowers. They are propagated by cuttings or slips, and the best season is in the latter end of March, when they should be planted in a shady situation; or at least be shaded with mats till they have taken root; after which they may be exposed to the sun, and, when they are strong enough, may be removed to the places where they are designed to remain. They delight in a dry gravelly soil, where they will endure our severest winters. Lavender is cephalic, nervous, and uterine; for by its aromatic, subtle, acrid particles, it stimulates the nervous fibres to an oscillation, and restores their tone; it dissolves thick humours, and renders them fit for motion. It is good in catarrhs, the apoplexy, palsy, spasms, the vertigo, lethargy, and trembling of the limbs. The dose of the flowers, or seeds, is from a scruple to a drachm; or the infusion may be drank in the same manner as tea. The dose of the conserve of the flowers is half an ounce, and of the essential oil, from two drops to six, on sugar.

LAUREOLA MAS, *Spurge Laurel*, has a tough, thick, long, woody root, divided into several branches, with several ash coloured or whitish stems, rising to the height of two cubits, with leaves like those of laurel, but less, or somewhat like those of myrtle, they are blackish, thick, smooth, shining, and pointed at both ends, and are thickish near the ends of the branches. It is an ever-green, and the flowers that grow on the top, are of a greenish yellow, consisting of a single petal, that is fibrous on the back part, but before divided into four acuminate segments; there is no cup, but there is a pistil that turns to a berry, in the shape of an olive, though much less. It is at first green, but black when ripe, and contains a hard oblong seed, full of a white pulp. The leaves, fruit, and bark, are very acrimonious, biting the tongue, as it were setting them on fire.

LAURUS VULGARIS, the *Bay-tree*, in hot countries, grows to a considerable height, and has a smooth trunk without knobs, and long branches; the leaves are long, sharp, hard, nervous, smooth, but have little juice, though they have a fine smell, and an acrid, bitter, astringent taste. The flower consists of a single petal, shaped like a funnel, and divided into four or five segments. The male flowers, which are produced on separate trees from the female, have eight stamina, which are branched into arms; and the embryo of the female flowers becomes a berry, inclosing a single seed within a horny shell, which is covered with a skin. Besides this, there are several sorts of Bay-trees, that are cultivated in gardens, most of which have been lately brought from distant countries. They are propagated either from the seeds, or by laying down the tender branches, which will take root in a year's time, and may then be taken

off, and transplanted into a nursery, or the places where they design to remain. The leaves are aromatic, bitterish, with somewhat of an astringency, and they are heating, resolvent, strengthen the stomach, help digestion, and discuss wind; for these purposes, the infusion may be drank as tea, or the powder may be given to a drachm. The berries are more heating than the leaves, and two scruples in infusion is a dose; but their principal use in the present practice is in clysters, and the leaves as a fomentation.

LEPIDIUM LATIFOLIUM, *common broad Dittander, or pepper wort*, has a white root, as thick as one's finger, that creeps in the ground, and has an acrid hot taste, that immediately vanishes. It has several stalks, two cubits in height, that are round, smooth, branched, and full of pith; it is covered with a blueish meal, which may be easily wiped off. The leaves are long, broad pointed, and like those of the citron-tree, but larger and softer, of a darkish green, and serrated on the edges. The flowers grow on the tops of the branches, and are small in proportion to the size of the plant; they consist of four petals, placed in the form of a cross; and the pistil, that rises out of the calyx, turns into a very small flat fruit, with a sharp point, and a partition in the middle, that divides into two cells, full of small, oblong, red seeds. The whole plant has an acrid taste, and grows wild in some parts of England; but it is generally cultivated in gardens for use. It is easily propagated, by planting small bits of the root, either in spring or autumn; but it should be placed in some corner of the garden, because the root will spread and over-run the ground. This plant incises gross humours, opens obstructions of the liver and spleen, and is accounted by some a great antiscorbutic. When the leaves are eaten fasting in the morning, they excite the appetite, and help digestion.

LEVISTICUM, *Lovage*, has a large fleshy root, blackish without, and white within, and the stalks often rise to the height of a man; these are thick, light, streaked, and divided into many branches. The leaves are like those of parsley, but larger every way, and they are smooth, shining, of a dark green colour, with a strong smell. The flowers grow in umbels on the tops of the branches, and are roseaceous, consisting of five yellow petals, or upwards. The calyx turns to a fruit, composed of two oblong, thick seeds, gibbous and streaked on one side, and on the other flat, and of a dirty colour. Lovage is said to be alexipharmic, carminative, diuretic, urine, and vulnerary. It strengthens the stomach, helps digestion, discusses wind, attenuates gross humours, eases pains of the cholic, and is good in the asthma. It is looked upon as a specific against the jaundice, especially when it proceeds from a clammy bile. The dose of the root, in powder, is from half a drachm to a drachm, and of the seed from a scruple to half a drachm.

LIGUSTRUM, *Privet*, is a shrub divided into a great number of branches, covered with an ash coloured bark, and the wood is whitish and hard. The leaves grow by pairs opposite to each other, and are oblong, and narrow like those of willow; but they are shorter, thicker, smooth, shining, and of a blackish-green colour. The flowers grow on the top in bunches, and consist of a single petal in the shape of a funnel, divided on the top into five segments. They are white, have a sweet smell, and in the middle there are placed yellowish green apices, with a green pistil that turns to a soft and almost globous berry, of the size of juniper berries, and are blackish when ripe, and full of juice. They contain generally four globous seeds, with a bay coloured skin, and a whitish pulp. It is com-

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mon in hedges in most parts of England, and generally grows to about eight or ten feet high. The leaves are bitter and styptic, and therefore they, as well as the flowers, are recommended by some against hæmorrhages.

LILIUM ALBUM, the *white Lily*, has a bulbous root, consisting of several fleshy scales, united together, and fixed to an axis, under which there are many fibres; the stalk is upright, and sometimes rises to the height of a cubit and a half; it is single, brown, and at the bottom there are oblong, broadish, fleshy, smooth leaves, without a pedicle, of a shining light green colour, but towards the top they become gradually less and narrower, and, if they are rubbed between the fingers, they have a smell like boiled mutton. There are several flowers placed on the top, that do not grow at the same time; they are composed of six leaves, in shape somewhat like a bell, and in the middle there is a longish pistil terminating in three points, of a greenish white colour; the stamina are also six in number, and of the same colour with the petals, with apices of a saffron colour. The pistil turns to an oblong triangular fruit, divided into three cells full of reddish seeds with borders, and lie upon each other in a double row. They are cultivated in gardens for the sake of their beauty and sweet smell. There are many other kinds of lilies, all which may be propagated by sowing their seeds in square boxes about six inches deep, with holes at the bottom, and filled with light, fresh, sandy earth. They are to be sown soon after they are ripe, pretty thick, and must be covered with light sifted earth about half an inch; then the boxes are to be placed where they have the morning sun only, and must be watered in dry weather. They must continue thus till October, when they must be removed to places where they may have as much sun as possible, and yet screened from the north and east winds during the winter; but in the spring, about the middle of April, they must be removed to their former position; for then the young plants will appear above ground. Here they must remain till August, when they must be taken out of the boxes with the earth, and planted in beds of fresh light earth; that is, the small bulbs, together with the earth, must be strewed over the beds, covering them about half an inch thick with fine sifted earth, observing to water them in hot and dry seasons. They must be shaded in the middle of the day, and refreshed now and then with water. In the spring, when the hard frosts are over, the surface of the beds must be cleared, and a little fresh earth sifted thereon; but this should not be deferred too long, lest the shoots should be coming up and broken by this means. When the leaves are decayed, you should stir the surface of the beds again, to prevent the weeds from growing, and in September you must sift some more fresh earth, to the thickness of half an inch. In September following, they will require to be transplanted to a greater distance in moist weather.

The flowers are used in emollient cataplasms, and the oil made by insolation is of common use in pains and tumours of all kinds. The roots are also in great request for softening and ripening tumours, and are particularly recommended for burns and bruises, when roasted under the ashes.

LILIUM CONVALIUM, *Lily of the Valley*, has a slender, white, fibrous root, creeping near the top of the ground, and produces two or three leaves, a palm and a half in length, two inches broad, shining, of a light green, nervous, and terminating in a point; among these the stalk arises to a span in height, which is slender, angular, naked, and from the middle of which, and at the top, there proceeds a long series of flowers, growing

at some distance from each other, but almost all looking the same way; they have very short pendulous pedicles, and consist of a single white petal, in the shape of a bell, divided into six segments, with as many stamina, of a greenish yellow, and adhering to the bottom; the pistil is triangular, and turns to a spherical, soft, red fruit, full of pulp, and three hard, horny, bitterish seeds. The flowers only are in use, which have a very pleasant agreeable smell. It increases very fast by its creeping roots, for which reason it may be propagated in great plenty, by parting the roots in October; they must be planted in a shady situation, and in a moist soil, placing them near a foot asunder. The flowers have a bitterish taste, and when dried, powdered, and snuffed up the nose, they occasion sneezing. It is accounted a cephalic nervous remedy, and to be good in all diseases of the head and nerves. The dose of the powder is a drachm, and of the conserve half an ounce.

LINUM VULGARE, *common Flax*, has a slender root, with a few fibres, and a round stalk, that is generally single, light, smooth, and grows to the height of a cubit, or a cubit and a half. The leaves are acuminate, of the breadth of a straw, and about two inches long; they are alternately placed on the stalk, and are soft and smooth. The flowers grow on the tops of the branches, on slender longish pedicles, and are of a blue colour; they consist of five petals, and when expanded, are in the shape of a clove gilly-flower. The flower cup is tubulous, consisting of a single leaf, and is divided into five parts at the top. The pistil, which rises from the center of the flower cup, turns into a globous fruit, that is slightly acuminate, and is composed of several cells, opening inward, full of flattish oval seeds, blunt at one end, and sharp at the other; they are smooth, shining, and of a yellowish purple colour. It is cultivated for use in many parts of Europe, and is accounted, with good management, a very advantageous plant. The seeds are mucilaginous, abate the acrimony of the fluids, and are greatly recommended against heat of urine. The expressed oil loosens the belly, appeases coughs, and promotes expectoration; it is accounted a specific against the pleurisy, when given from two to four ounces every fourth or sixth hour; but it must be fresh, and have a sweet taste. Externally it is emollient, and relaxes the contractions of the tendons. It is called linseed oil, and its use in painting is very well known.

LITHOSPERMUM, *Cromwell*, has a woody fibrous root, about as thick as one's thumb, with upright, stiff, round, rough, branched stalks, that rise to a cubit and a half in length; there are many leaves, placed alternately, that are two or three inches long, sharp, rough, without pedicles, and of a blackish green colour. The flowers proceed from the places where the leaves join to the stalk, and consist of a single white petal, in the form of a funnel, divided into five blunt segments, with a hairy calyx, consisting of a single leaf, cut almost to the bottom in five narrow hairy segments; the pistil is green, and attended with four embryos, that turn to as many roundish, hard, smooth, shining seeds, of the colour and shape of small pearls. It grows in shady lanes, and uncultivated places, in various parts of England. The seed is accounted a great diuretic, and a gentle anodyne; for which reason it is recommended to promote urine, and expel gravel. The dose is to two drachms.

LUJULA, *wood Sorrel*, is a low plant, with a thickish, scaly, reddish, white root, from whence proceed weak, slender, brown pedicles, a palm in length, on which are three leaves, that are thin, broader than long, smooth, in the shape of a heart, and of a pale green colour. Among these there

there are other pedicles, each sustaining a single flower, that consists of one petal, in the shape of a bell, and divided into five segments; it is white, open, transparent, and the calyx is divided into five parts, with a pistil fixed in the lowest part of the flower like a nail, that turns to a cylindraceous five cornered fruit, divided into five cells, containing shining reddish seeds, which, when ripe, burst out with violence. It grows in most parts of England, and has much the same virtues as common sorrel. It quenches thirst, mitigates heat, and resolves viscid blood; whence it is said to cool the liver, and is accounted a good antiscorbutic. The dose of the juice is an ounce.

LUPINUS, FLORE ALBO, *the white Lupine*, has a single, woody, fibrous root, and a stalk that rises to a cubit and a half in height, which is pretty thick, upright, round, a little downy, and full of pith. The flowers, which grow on the top, are papilionaceous, and appear in spikes at the top of the branches, on short pedicles. The pistil, which rises from the calyx, turns to a thick, broad, flat pod, three inches long, with a yellowish colour, and a little hairy on the outside, but smooth within, and contains pretty large, roundish, flat seeds, white without, but yellowish within, and very bitter. The leaves are irregularly placed on pedicles, two or three inches long, and consist generally of seven oblong, narrow segments, proceeding from the same point of the pedicle, like those of cinque-foil. Lupines are used externally, in decoctions, against diseases of the skin; and their meal is mixed in cataplasms, being reckoned among the four resolvent meals.

LUPULUS, *the Hop-plant*, has a creeping root, with such weak stalks, that they could not support themselves without twisting about whatever is near them; they are exceeding long, rough, angular, hairy, and hollow; the leaves proceed from the stalks by pairs, and are placed over against each other; they are like those of the mulberry-tree, and terminate in points; they are generally divided into three, and sometimes into five segments, and are serrated on the edges. That sort, which bears flowers, has no seeds, and that, which has seeds, has no stamina. The male flowers consists of a calyx divided into five parts, and surrounds the stamina, but there are no petals; the flowers of the female plants are collected into scaly heads, which grow in bunches, and have some resemblance to pine-apples; they are composed of several membranaceous loose scales, of a yellowish green colour, and adhere to a common axis; the seeds are small, flat, and red, and have the smell of garlick. The people that cultivate hops reckon three varieties, as the *long square garlick Hop*, the *long white Hop*, and the *oval Hop*, all which are cultivated in England, and particularly in Kent, where they account new land best for their growth. The first shoots of hops, or rather their heads, are commonly called hop-tops, and are by some accounted not inferior to asparagus. They gently loosen the belly, and are good in obstructions of the viscera; as for the use of hops, it is very well known throughout the world, it being brewed in malt liquors, to prevent their growing sour.

MAJORANA, *sweet Marjoram*, has slender roots, and the stalks rise to a palm in height, and upwards; they are slender, woody, often square, a little hairy, and reddish, about which the leaves are placed opposite to each other. It is a very verticillated plant, and the flowers grow on the tops of the branches, and consist of a single, labiated, whitish petal, whose upper lip is upright, roundish, and divided into two parts, and the lower into three. The flowers are collected into thick, short, round heads, and proceed from a four-fold order of leaves, placed like scales. It is cultivated in gardens, and is an

annual plant; for which reason the seeds must be sown every year, which are brought from the southern parts of France, where it grows wild. They must be sown in the beginning of April, in a dry warm spot of ground, and in June the plants will be strong enough to be removed into beds of rich light earth, where they are to be placed four inches distant from each other; they will flower in the beginning of August, and then is the time to pull them up for medicinal use.

MAJORANA TENUIFOLIA, *gentle Marjoram*, differs only from the former, in having more slender, and fragrant leaves. They both consist of fine oleous, aromatic, active particles, and are used as pot herbs, and sometimes in sallads, to promote digestion, and to disperse wind. They attenuate gross viscid humours, excite the sluggish, languid oscillations of the fibres, and open the pores of the brain and nerves, upon which account it is good in cold diseases of the head, and trembling of the joints. A scruple, or half a drachm of the powder, mixed with a proper conserve, and taken every morning, has been greatly commended in the epilepsy; it is also an ingredient of the cephalic snuffs, because it is said to purge the head.

MALVA VULGARIS, *common Mallows*, has a single white root, with a few fibres, and a stalk that rises to a cubit and a half in height, and upwards; many of these proceed from the same root, and are round, hairy, branched, and full of pith. The leaves grow single about the stalk on long pedicles, and are roundish and jagged on the edges, with a little down, are of a blackish green colour, and crenated on the edges. The flowers proceed from the places where the pedicles of the leaves join to the stalk; they are large, in the shape of a bell, and consist of a single petal, divided into five segments, in the shape of hearts; they are purplish, and streaked with deep purple lines, but are sometimes variegated with white. From the bottom of the flower proceeds a tube, in the shape of a pyramid, on which are purplish stamina. It has a double calyx, the innermost of which is divided into five parts, and the outermost into three. The pistil arises from the bottom of the calyx; it is placed in the tube, and turns to a flat round cake, somewhat in the form of a cheese; for which reason they are commonly called cheese-cakes by children. They contain a great number of seeds, in the shape of kidneys, which are disposed round an axis, in such a manner, that they appear to be very artificially jointed. *Mallows* were formerly used for food; but is now only in request on account of its medicinal virtues, for it is an emollient, and abates the sharpness of urine. It is also used in emollient cataplasms.

MALUS SATIVA, *the Apple-tree*, grows to a considerable size, and the branches are spreading, but more depressed than those of the pear-tree. The flowers consist of five leaves, which expand in the form of a rose, with yellow apices in the middle, and a green calyx, divided into five parts, which turns to a fleshy roundish fruit, generally umbilicated at each end; however, they are of different sizes and shapes, according to their different kinds, which are generally so well known, that they need no description. The first apple which is brought to market is the codlin, and the next is the margaret-apple, which is not so long as the codlin, and the side next the sun changes to a faint red when ripe; but the other side is of a pale green. This fruit is firm, and has a pleasant taste, but does not keep long. The summer pearmain is an oblong fruit, striped with red next the sun, and the flesh is soft, and grows mealy in a short time. The Kentish fill-basket is of a large size, is of a somewhat longer shape than a codlin, and ripens a little later. Loan's pearmain is a beautiful fruit, and of a fine red next the sun; the flesh is vinous, but soon grows mealy.

The **QUINCE APPLE** is of the size of a golden pippin, but shaped like a quince, especially towards the stalk; the side next the sun is of a russet colour, but the other side is inclining to yellow. It is an excellent apple, but will not keep above three weeks in September. The golden rennet ripens about Michaelmas, and continues to be a good fruit about a month. The aromatic pippin is of the size of a nonpareil, but a little longer, and the side next the sun is of a bright russet colour. It ripens in October. The winter pearmain is rather long than round, of a fine red next the sun, and striped with the same colour on the other side; the flesh is juicy, but it is not a good eating apple. The Kentish pippin is large and handsome, and of a pale green colour. It is a very good kitchen fruit, and will keep till February. The Holland pippin is larger than the former and of a darker green. It will keep longer than the former. The monstrous rennet is very large, of an oblong shape, reddish towards the sun, and of a dark green elsewhere; it is of no great value. The embroidered apple is pretty large, with red broad stripes, from whence it has its name; it is a tolerable kitchen apple. The royal russet is of a deep russet colour, and is large, and of an oblong shape, but broad towards the base, and the flesh is a little yellowish. It will continue good from October to April, and is the best of all kitchen apples. Wheeler's russet is of a light russet colour next the sun, and of a pale yellow on the other side. The size is middling, the flesh firm, and has a quick, tartish taste; it will keep a long while. Pile's russet is oval, and of a russet colour next the sun, but of a dark green on the other side; it is a good baking apple, and will keep sound till April. The nonpareil is very well known, but there is another apple generally sold for it, that is a larger fruit, and more inclining to yellow. It is ripe earlier, sooner gone, and is not so flat as the true nonpareil; which last is not ripe before Christmas, and will keep good till May. The golden pippin is peculiar to England, for it will not succeed well in other countries. It is an excellent apple, and would be still better, if proper care was taken in its cultivation. There are a great many other sorts of apples, which have no particular names, except such as serve for making cyder; the redstreak, the whitfour, the Hertfordshire under leaf, the John apple, the everlasting hanger, and the gennet moil. They are all propagated by grafting or budding upon stocks of the same kind. Apples in general are used for eating and baking; but, as for their medicinal virtues, they are scarcely worth mentioning, though they are said to temperate the bile, and to be good in fevers to allay thirst. Some pretend they are excellent pectorals, and will appease coughs; but this may be doubted.

MALUS GRANATA, five **PUNICA**, the *Pomegranate*, is a low tree, or rather a shrub, with slender angular branches, beset with long thorns or prickles. The leaves are like those of the myrtle tree, or olive, only not so sharp, and are of a shining green, with reddish pedicles and veins. The flowers are rosaceous, consisting of five petals of a red or scarlet colour, in the middle of which there are many stamina, with their apices, and the calyx is also red, above an inch long, in the form of a bell, and divided into five pointed jaggs, which, after it is turned to a fruit, are placed round the navel at the top. Pomegranates are of various sizes, some being as big as large apples. The rind is pretty thick, hard, and brittle; before it is ripe it is green, and smooth, but afterwards reddish and wrinkled, and last of all it becomes of a bay colour, and yellowish within, with an astringent taste; it is full of seeds disposed in various cells, and the pulp has a sweetish vinous flavour; though it is sometimes acid. There are several kinds, as the common pomegranate, the

sweet, the wild, the double flowered, and the American double pomegranate. The first and second of these are hardy enough to resist the severest cold of our climate, in the open air; and, if planted against warm walls, the first sort will often produce fruit, which in warm seasons will ripen tolerably well; but they are seldom well tasted in England. These plants may be easily propagated, by laying down their branches in the spring, which in one year's time will take good root, and may then be transplanted where they design to remain; and the best season for this is the spring, just before they begin to shoot. The flowers always proceed from the extremity of the branches which are produced the same year, for which reason all the weak branches of the former year should be cut out, and the stronger should be lengthened according to their strength. The best time for this is the beginning of October.

MALICORIUM, or the rind of the *Pomegranate*, has a bitterish austere taste, is very astringent, and will supply the place of oak bark, for tanning of leather, as well as of galls for the making of ink. It is good in a diarrhoea, and all fluxes of the belly whatever, as well as in hemorrhages. It strengthens the tone of the parts, and sometimes proves an aperient as well as an astringent. The dose, in powder, is from half a drachm to a drachm, and in decoction to half an ounce.

BALAUSTIA, *Balaustines*, are the flowers of all sorts of pomegranates, with their flower-cups; but those of the double sort are generally chosen, because they are large, and have a great number of petals. The cup is not so long as in the first sort; it is however more flat and broad, and the colour is of a yellow purple. They are astringent, but not so much as the rind, and therefore they have been in frequent use in all sorts of fluxes whatever; but they are seldom met with in extemporaneous prescriptions, though often in shop medicines. The dose, in powder, is to a drachm, and to half an ounce in decoction.

MALUS PERSICA VULGARIS, the common *Peach tree*, rises to a moderate height, and has a pretty thick stem, with many brittle branches, and a reddish and brownish bark. The leaves are thin, oblong, acuminate, crenate, and like those of the almond tree; but larger, and have a bitter taste, like those of peach kernels, though not so pleasant. The flowers appear in the beginning of the spring, before the leaves, and without pedicles; for they adhere to the tubercles of the branches, and are rosaceous, consisting of five broad petals, of a light reddish colour, and in the middle there are many longish stamina, that are either purple or white, with a pistil of the same length, that proceeds from a reddish calyx, divided into five acute segments, and turns to a fruit that is almost globous, though a little flattish on one side, and is furrowed according to the length, and covered with a thick, soft, whitish down, in many of the species; but some are smooth, of a yellowish herbaceous colour, and these are commonly called *Nectarines*, which contain a woody, oblong, oval stone, consisting of two valves, deeply furrowed, and the pulp in some adhere very obstinately thereto, but in others it readily parts from it. When the bark is wounded, a gum will proceed from it like the plumb tree gum.

Some Peach trees are cultivated for the beauty of their flowers, as the peach tree with double flowers, the dwarf peach tree with single flowers, and the double flowering dwarf peach tree, though some place these two last among the almonds. The peach trees, that are cultivated for their fruit, are the white nutmeg peach, which has serrated leaves, and large open flowers, but the fruit is small and white, as is also the pulp at the stone, from which

it easily parts. It is esteemed for being the soonest ripe.

The *early purple* PEACH TREE has leaves even at the edges, and the flowers are large and open; the fruit is large, round, and of a fine red colour, and the flesh is white except at the stone, where it is very red. It is full of juice of a rich vinous flavour, and is an excellent peach; it is ripe towards the latter end of August.

The *large French Mignon* PEACH TREE has leaves that are even at the edges, and the flowers are large and open; the fruit is a little oblong, and has generally a swelling on one side. It has a fine colour, and the juice is very sweet, with a high flavour; the flesh is white, but very red at the stone, which is small; it is ripe towards the end of August. It is separated easily from the stone, and is one of the best sorts.

The *Belle Chevreuse* PEACH TREE has smooth leaves, and the flowers are small and contracted; the fruit is of a middling size, a little oblong, and of a fine red; the flesh is white, but very red at the stone, from which it easily parts; its juice is sweetish and rich, and it ripens in the beginning of September.

The *red Magdalen* PEACH TREE has deeply serrated leaves, with large open flowers, and the fruit is large and round, and of a fine red; the flesh is white, but very red at the stone, from which it readily parts. The juice is sweetish, and has a very fine flavour; it is ripe at the beginning of September, and is one of the best peaches.

The *Chancellor* PEACH TREE has leaves that are even at the edges, and has small contracted flowers; the fruit is shaped somewhat like the *belle chevreuse*, but is rounder, with flesh that is white, and melts in the mouth; it parts freely from the stone, where it is of a fine red. The skin is very thin, and the juice rich; it ripens in the beginning of September, and is one of the best sort.

The BELLEGARD has leaves that are even at the edges, with small contracted flowers; but the fruit is very large and round, and is of a deep purple colour, next the sun; the flesh is white, melts in the mouth, and parts readily from the stone, where it is of a deep red; the juice is very rich. It ripens in the middle of September, and is an excellent peach.

The *Bourdine* PEACH TREE has leaves that are even at the edges, with small contracted flowers, and large round fruit, of a fine red colour next the sun; the flesh is white, melts in the mouth, and parts readily from the stone, where it is of a fine red; the juice is vinous and rich, and ripens in the middle of September.

The *Rosanna* PEACH TREE has leaves that are even at the edges, with small contracted flowers, and large fruit; the flesh is yellow, and parts readily from the stone, where it is red. The juice is rich and vinous, and it ripens in the middle of September.

The *Rambouillet* PEACH TREE has leaves that are smooth at the edges, with large open flowers, and fruit of a middling size, rather round than long, and divided by a deep furrow in the middle; it is of a fine red colour next the sun, and of a light yellow next the wall. The flesh is of a bright yellow, melts in the mouth, and parts readily from the stone, where it is of a deep red, and the juice is rich, with a vinous flavour; it ripens at the latter end of September.

The *Nivette* PEACH TREE has serrated leaves, with small contracted flowers, and large fruit, somewhat longer than round, of a bright red colour next the sun, and of a pale yellow on the other side; the flesh melts in the mouth, is full of a rich juice, and is

very red at the stone, from which it parts. It ripens towards the latter end of September.

The *bloody* PEACH TREE bears fruit of a middling size, of a deep red next the sun, and flesh that is of a deep red to the stone; but it seldom becomes quite ripe in England. Besides these, there are a very great variety of other species of peaches; but as these we have here described are the most usual sorts planted, we shall not tire the reader with a long catalogue of names, which he may never have occasion to peruse. A good peach ought to have a firm flesh, a thin skin, of a fine red colour next the sun, and of a yellowish cast next the wall; the flesh should be of a yellowish colour, full of juice, and high flavoured, with a small stone, and the pulp or flesh very thick.

All Peach trees have been originally obtained from the stones, which should be planted in autumn, on a bed of light dry earth, about three inches deep, and four inches asunder; in the winter the beds should be covered to protect them from the frost, and in the spring, when the plants come up, they should be carefully cleared from the weeds, as well as all the summer observing to water them when the weather is dry. They should remain here till the following spring, when they should be carefully taken up, without breaking the tender roots, and transplanted into a nursery in rows, three feet asunder, and eighteen inches distant plant from plant in the rows, observing to lay a little mud about the roots; they must also be watered in dry weather once a week, till they have taken root. Here they may continue two or three years, till they are transplanted, where they are to remain. When this is done, the downright roots must be pruned pretty short, and the bruised parts cut off, as well as the small fibres; but the heads should not be meddled with. These are generally designed for standards. As for the planting, budding, and management of peach trees that are to be placed against walls, we must refer the reader to books entirely devoted to the use of the common gardener, as it would take up more room than this treatise will allow.

The NECTARINES are properly peaches, though generally distinguished from them, of which the following are the most remarkable sorts; and indeed it may be doubted whether there are really any more or not.

Fairchild's early NECTARINE TREE produces fruit the soonest ripe of any we have; it is small and round, about the size of a nutmeg peach, and of a beautiful red; it has a very good flavour, and ripens towards the end of July.

The *Etruge* NECTARINE TREE has serrated leaves, with small flowers of a dark red or purple next the sun; but of a pale yellow or greenish colour towards the wall; it parts from the stone, melts in the mouth, and is ripe in the beginning of August.

The *Newington* NECTARINE TREE has serrated leaves, with large open flowers, and a fair large fruit, of a beautiful red next the sun, but of a bright yellow towards the wall; it has a very rich juice, and the pulp or flesh adheres closely to the stone, where it is of a deep red. It ripens in the middle of August, and has a better flavour than any of the rest.

The *scarlet* NECTARINE TREE bears fruit a little less than the former, of a fine red or scarlet next the sun, but of a paler red towards the wall; it ripens in the beginning of August.

The *Brugnon* or *Italian* NECTARINE TREE has leaves that are even on the edges, and small flowers, with a fair large fruit, of a deep red next the sun, but yellowish towards the wall; the pulp is firm, of a rich flavour, and closely adheres to the stone, where

it is very red; it ripens towards the latter end of August.

The *Roman red* NECTARINE TREE has leaves that are even at the edge, and flowers with large fair fruit, of a deep red or purple colour next the sun, but has a yellowish cast towards the wall; the pulp is firm, of a rich flavour, and adheres closely to the stone, where it is very red. It ripens towards the latter end of August.

The *Murrey* NECTARINE TREE bears a middle sized fruit, of a deep red next the sun, but of a yellowish green towards the wall; it has a pretty good flavour, and ripens towards the end of August.

The *golden* NECTARINE TREE bears a handsome fruit, of a light red next the sun, and of a bright yellow towards the wall; the pulp is very yellow, has a rich flavour and closely adheres to the stone, where it is of a faint red; it ripens towards the middle of September.

Temple's NECTARINE TREE bears a middle sized fruit, of a light red next the sun, and of a yellowish green towards the wall. The pulp melts in the mouth, and is of a white colour at the stone, from which it readily parts, and has a fine flavour; it ripens towards the end of September.

The *Peterborough, or late green* NECTARINE TREE, bears a middle sized fruit, of a pale green next the sun, but of a whitish green towards the wall. It has a firm well flavoured flesh in a good season, and ripens in the beginning of October.

The flowers have an aromatic bitter taste, and, when fresh, an infusion of half an ounce in water, or a drachm when dry and sweetened with sugar, is a useful laxative for children. Peaches themselves agree very well with persons of hot constitutions, and costive, especially if they are eaten in a morning fasting. Peach kernels are bitterish, diuretic, and good against worms. The leaves have the same virtues, and the gum resembles gum arabic.

MANDRAGORA MAS, *seu* CANDIDA, *Mandrake* has a thick long root, generally divided into two parts, and sometimes more; it is whitish without, or of a rusty ash colour, and pale within. It has no stalk, though it has leaves a cubit in length, and a palm and a half broad, and sharp at both ends; among these pedicles arise stalks, a palm in length, on each of which there is a single flower, in the shape of a bell, consisting of a single leaf, divided into five segments; it is a little hairy, of a dirty white, or purplish colour, with a hairy green calyx, divided into five parts; from whence arises a pistil, fixed in the bottom part of the flower, that turns to a fruit, like a small apple, at first green, and then yellowish, fleshy, soft, of a strong nauseous smell, and in the pulp there are roundish flat seeds, somewhat in the shape of a kidney.

MANDRAGORA FEMINA *seu* NIGRA, *female Mandrake*, has leaves like that of the former, but narrower, less, and blacker; the flowers are of a bluish purple, and the fruit are paler, less, and in the shape of a pear. They both grow wild in Italy and Spain, as well as other hot countries, and delight in woody and shady places. With us they are cultivated in gardens, and the seeds are sown in a bed of light earth, soon after they are ripe; they come up in the spring, and in very dry weather they must be refreshed with water. They should remain here till the end of August, and then they should be transplanted to the places where they are to remain. The roots will continue sound for above fifty years; but as to the resemblance to a human form, as many assert, it is nothing but an imposture, owing to persons that would deceive the publick, who form the fresh roots of Bryony into such shapes, and show them for Mandrakes. Many wonderful things have been said of its virtues, by different authors; however, they all agree it is a narcotick, and, when taken

in too large a dose, will produce dangerous symptoms. Some have given it from half a scruple, to procure sleep. Some affirm, that the leaves applied outwardly, as a cataplasm, will resolve hard swellings of the spleen.

MARRUBIUM, *Hoar-bound*, has a single woody root, which sends forth many fibres, and several stalks, to the height of a foot and upwards; these are hairy, square, branched, and the leaves proceed from the joints in pairs, which are placed opposite to each other; they are roundish, hoary, wrinkled, and crenated on the edges. The flowers likewise proceed from the joints, and surround the stalks; the calyx, or flower cup, is hairy, streaked, and terminates in prickles; the flower consists of a single labiated leaf, of a whitish colour, whose upper lip is upright and forked, and the lower divided into three segments. The pistil is fixed in the back part of the flower, like a nail, and attended with four embryos, that turn to as many oblong seeds, contained in a capsula, that was the calyx of the flower. The whole plant has a strong disagreeable smell, and grows near highways, and on the sides of fields, in neglected places. It is aperient, powerfully resolves viscid humours, and by some is accounted a specific in a moist asthma.

MARRUBIUM NIGRUM, *black Hoar-bound*, has a perennial fibrous root, and hairy, square, light, branched, reddish stalks, with leaves that proceed from the joints in pairs, and are placed opposite to each other; they are like those of the Balm, or rather red Archangel, only they are rounder and blacker; they are hairy, soft to the touch, and wrinkled. The flowers likewise proceed from the joints, and consist of a labiated single petal, whose upper lip is hollow like a spoon, and the lower divided into three segments, of which that in the middle is biggest, and in the shape of a heart; the colour is purple, streaked with deeper lines of the same; the flower cups are streaked, oblong, and divided into four or five sharp segments. The pistil is fixed in the back part of the flower, and is attended with four embryos, that turn into as many small oblong seeds, that are blackish when ripe, and contained in a tubulated capsula, with five sides, that was the calyx of the flower. It grows wild by the sides of hedges. The leaves are bitter, have a strong smell, and by some are accounted an excellent remedy in hypochondriac and hysteric disorders.

MARUM VERUM, *seu* MARUM CORTUSI, *Syrian herb Mastich*, has a fibrous root, and a stalk that rises to the height of a foot, or rather several hoary downy stalks, with leaves like the end of a lance, a quarter of an inch long, two broad, and of a light green above. The flowers are like those of Germander, and consist of a single, labiated, purple petal, whose stamina are in the room of an upper lip; but the lower is divided into five segments, the middlemost of which is hollow like a spoon. The calyx is likewise like that of Germander, and the pistil is fixed on the back part of the flower, with four embryos, that turn into as many roundish seeds. This plant has the appearance of a shrub, and has a hot volatile smell. It is propagated by cuttings, in any of the summer months, on a bed of fresh light earth, observing to water and shade them, till they have taken root; after which they may be transplanted either in pots or borders of the same earth; but the greatest difficulty is to preserve it from cats, which will come from a great distance, to tear this plant in pieces; for which reason, it is hard to preserve it near towns and cities. The best way is to plant large quantities thereof, and then they will not come near them. When they are placed in pots, they may be cut into any figure, for they will grow to near three feet high. It is said to be good in cold and moist diseases, and to be an excellent diuretick; though

though it is of little use with us, except in making herb-snuff. However, it is certainly better than Marjoram, and the dose of the powdered leaves is a drachm.

MARUM, *herb Mastich*, is a small woody shrub, with many branches, and slender woody roots, with leaves like Thyme, but hoary, and which smell like Mastich. The flowers are white, and consist of a single labiated petal, whose upper lip is upright, and divided into three segments, but the lower into three in such a manner, that it looks like a flower with five leaves, and have a white down growing upon their oblong heads. This plant is propagated by cuttings, in any of the summer months, in a bed of light rich earth, observing to water and shade them till they have taken root, after which they may be transplanted into a light dry soil, in a warm situation. It produces great numbers of flowers in July, has an agreeable smell, and deserves a place in the borders of every good garden. The virtues are the same as those of the former, and it is undoubtedly an excellent cephalic.

MATRICARIA, *Feverfew*, has a white fibrous root, with several stalks, that rise to the height of a cubit and a half; these are strong, streaked, smooth, thick, and full of a spongy pith, with many leaves of a light green colour; they are conjugated, and divided into many segments, which are by some called wings. The flowers grow in umbels, on the top of the stalks; they are radiated, but not large, and the disk consists of many yellow florets, and the crown of white semi-florets, placed over the embryos of the seeds in a semi-spherical scaly cup. The seeds are oblong, small, streaked, and fixed in a bed at the bottom of the cup. The whole plant has a very strong smell, and is found wild upon dunghills and uncultivated places, in many parts of England; it is likewise planted in gardens for medicinal purposes. They are propagated by seeds, which should be sown in the latter end of March, upon a bed of light earth, and when they are come up, they should be removed to nursery beds, and placed about eight inches asunder, where they may remain till the latter end of May; then they may be taken up, with a ball of earth at their roots, and planted in the middle of large borders, where they will flower in July and August. It is an hysterical plant, and is excellent in uterine disorders. The dose, in powder, is from half a scruple to two scruples, and of the juice to an ounce or two. It is certainly a very good carminative, as it discusses wind, strengthens the stomach, and helps digestion. Outwardly, it is prescribed in fomentations, with camomile flowers.

MELILOTUS, *Melilot*, has a white, slender, tough root, with many short fibres, and generally several stalks, which sometimes rise to a cubit and a half in length; these are smooth, round, streaked, and weak, and the leaves are placed alternately thereon, by threes, on the same slender pedicle; they are smooth, oblong, denticulated, and of a dusky green. The flowers grow on long spikes, and are papilionaceous, small, yellow, and consist of four petals; these are succeeded by short, single, pendulous, wrinkled, naked pods, not hid in a calyx, as in trefoil, and they are black when ripe, containing one or two roundish seeds of a yellowish colour. It is found near hedges, and among corn. It is seldom given inwardly, but is often used outwardly, and in clysters. It is said to be emollient, anodyne, and resolvent, and is used by some in all kinds of external inflammations.

MELISSA, *Balm*, has a round, long, fibrous, woody root, with stalks that rise to a cubit high, and upwards; these are square, almost smooth, branched, hard, stiff and brittle. The leaves are oblong, of a brownish green, and pretty much like those of cala-

mint; but they are shining, covered with a little down, and dentated on the edges. The flowers grow at the places where the leaves proceed from the stalks, and are somewhat verticillated, though they do not grow quite round the stalks; they consist of a single labiated petal, whose upper lip is roundish, upright, and divided into two parts; but the under lip is cut into three. The hairy calyx is divided into two parts, and the pistil is attended with four embryos, that turn to as many seeds, joined together, of a roundish shape, and contained in a capsula that was the cup of the flower. It is cultivated in gardens, and flowers in June, July, and August. It is propagated by parting the roots, either in spring or autumn, or by planting slips at the distance of eight or ten inches. Balm is said to be cordial, cephalic, and to fortify the stomach. It is taken in the manner of tea, is a little aromatic, and has done service in a lax state of the viscera.

MELISSA SYLVESTRIS, *wild Balm*, is nothing less than the former in its primitive state, before it is cultivated in gardens. This plant has a bad smell, and grows in woods, flowering in May and June. It is reckoned a vulnerary, and is said to be an excellent remedy against suppression of urine.

MELO VULGARIS, *common musk Melon*, is a plant, with stalks that creep along the earth, and are rough to the touch, as well as the leaves, which are smaller and rounder than those of Cucumbers. The flower consists of a single petal, in the shape of a bell, cut into several segments, exactly like those of a Cucumber, and some of them are barren, while others are fruitful, and turn into a fruit of an oval shape, and different sizes; the rind is harder than that of a Cucumber, pretty thick, variegated with green and ash colour. The pulp is tender, moist, clammy, yellow, or red, and when ripe, has a very agreeable flavour. It is divided into three cells, containing oblong, flat, whitish yellow seeds, covered with a hard skin, containing an oily kernel, but is very white, and has a sweetish taste. There are several sorts of Melons, besides that already mentioned, as the *Portugul*, or *pocket Melon*, the *netted or wrought Melon*, the *great musk Melon*, with a smooth green skin, and a green seed, the *white Spanish Melon*, the *green fleshy Melon*, the *Cantaloupe Melon*, the *Zatta Melon*, the *Melon with a hairy skin*, and the *winter Melon*. The seeds should not be sown till they are three years old, and it should be at two or three different seasons, the first of which is the latter end of February, when the weather is mild, on the upper side of a Cucumber bed, and the plants must be raised and managed in the same manner as Cucumbers. The second season is about the latter end of March, and they both should be planted under frames. Those that are designed to be raised under bell-glasses, must be sown about the latter end of April, if the season proves forward; but if it be cold, it had better be deferred somewhat later. There are particular rules required for their management, that are too long to be inserted here, and therefore we shall only observe, that when the fruit is fully grown, they must be carefully watched, to cut them at a proper time; and therefore they should be looked over at least twice a day; for if they are left growing a few hours too long, they will lose much of their delicacy. If they are cut early in a morning, before the sun has warmed them, they will be much better flavoured.

The seeds of Melons are one of the greater cold seeds, and serve to make emulsions; but at present they are not so much taken notice of as formerly.

MENIANTHES, *five TRIFOLIUM PALUSTRE*, the *Buck-bean*, has a long, knotted, creeping root, which has fibres by intervals, and there are three

three leaves that grow on the same pedicle, that are of the same size and shape as those of beans, and smooth to the touch. Among these there arises a stalk to the height of a foot and a half, which is slender, smooth, green, and bears a tuft of flowers at the top, in the shape of a funnel, and of a whitish purple colour. Before they open they are red, and after they are open they divide into five pointed segments; their internal surface is covered with very slender, white, curled filaments, that appear like down. The cup of the flowers is in the shape of a mug, and dentated, and each flower contains five white stamina, with yellow apices; the pistil is placed in the middle, and is shorter and greener than the stamina. These are succeeded with roundish or oblong fruit, that contains oval seeds like those of the Sun flower. This plant grows wild in marshes, and flowers in May or June. Buck-bean has gained great reputation for its virtues, and is found very efficacious in the gout, king's-evil, the cachexy, and dropsy. In a fit of the gout, the patient must drink a glass of the decoction every four hours; but Boerhaave was relieved in this distemper, by drinking the juice mixed with whey. It will be likewise proper to apply the leaves that have been boiled, to the painful part, after the decoction is strained off. The seed is good against the moist asthma, for it incises the gross phlegm that stuff the lungs. This plant is in such reputation in Germany, that they give it in almost all diseases.

MENTHA VULGARIS, *garden, or spear Mint*, has a creeping root, furnished with fibres, that extend far and near; the stalks rise to a foot and a half in height, and are square, a little hairy, strong, and reddish. The leaves are placed by pairs opposite to each other, and appear at first sight like Balm; but those at the top of the stalk are longer, and more pointed, and of a deep green colour; they are also more deeply dentated. The flowers grow in spikes, and consist of a single labiated petal, whose upper lip is arched, and the lower divided into three parts; but both of them are so cut, that the flowers seem to be divided into four parts, the two lips scarcely appearing. Each flower is succeeded by four seeds contained in the flower cup. Mint has a peculiar well known strong smell. It is cultivated in gardens, and flowers in July and August. Besides this, there is the *pepper Mint*, the *long leaved horse Mint*, *water Mint*, commonly called *water Calamint*, *orange Mint*, *Spear-Mint with a variegated leaf*, the *great round leaved water Mint with a variegated leaf*, *Spear-mint with a rugged leaf and a strong scent*, and *narrow leaved Aleppo Mint*. They are all propagated by parting the roots in the spring, or by planting the cuttings in any of the summer months.

SPEAR-MINT is stomachic, cephalic, and carminative, and is excellent in the loss of appetite, retchings to vomit, and weakness of the stomach. It resolves coagulated blood, eases pains of the cholic, and does a great deal of service in fluxes of the belly. It may be drank as tea, especially when the leaves are dry, and the infusion must be strong. Water Mint has a bitter, acrid, aromatic taste, is stomachic and diuretic, and, like the former, may be drank as tea. The juice is good against the gravel, stops vomiting, and hiccoughing, cures the gripes, and swelling of the stomach.

MENTHA ALBA, *five MENTASTRUM*, *Horse-Mint*, has a fibrous creeping root, and sends out stalks to the height of a cubit, and upwards, which are square and hairy. The leaves are almost round, wrinkled, and covered with a white wool. The flowers are like those of garden Balm, and are of a whitish red colour, with dentated flower-cups. Each flower is succeeded by a small black seed.

The leaves have a bitter, acrid, astringent taste, with a strong smell, and it grows by the sides of brooks, and in moist places in most parts of England. It is said to kill worms, to help the moist asthma; and many apply a cataplasm made with this plant, to the affected part, against the hypogout; they affirm it raises blisters, which when broken ease the pain.

MENTHA PIPERITES, *Pepper-mint*, has shorter and fuller spikes than the common Mint, but the leaves are like them, only they are covered with a short hairy down. This plant has been lately brought into esteem, and is of great use in flatulent cholics, and in many cold diseases; its effects are almost immediately felt; for it causes a glowing warmth to be felt throughout all parts of the body. It readily communicates its pungency to water, as well as to that which is distilled from it.

MERCURIALIS, *male and female French Mercury*. The male has a tender, fibrous, annual root, and sends forth stalks to the height of a foot, that are angular, geniculated, smooth and branched. The leaves resemble those of pellitory, and are oblong, pretty broad, sharp, smooth, and green; they are placed by pairs opposite to each other on the stalk, and are crenated on the edges; the flower cup consists of one leaf cut into three segments, as well in the male as in the female. The flower of the male has no petals, but has from eight to twelve stamina collected into a spike. There are two embryos contained in a sort of purses, and, when they are ripe, there is in each a small oval seed.

The *female Mercury* resembles the male in all respects, except the flowers; for these produce neither fruit nor seed. The virtues are both alike, and they flower all the summer. The leaves are said to be aperient and laxative, and they are placed among the five emollient plants. It is sometimes made use of in clysters, and a syrup made of the leaves is a mild and useful laxative; the dose is two spoonfuls, which is to be given three hours before meals. Warts rubbed with this plant will frequently soon wither away.

MESPILUS APII FOLII SYLVESTRIS SPINOSA, *five SPINA ALBA*, the *White Thorn* or *Hawthorn*, is a shrub that has a pretty thick firm trunk, full of branches, and armed with strong thorns, that are much harder than the wood. The branches are strong and flexible, and the leaves are like those of parsley, and have a clammy taste. The flowers grow in tufts, and have pedicles about an inch and a half in length; they are white, have five petals, placed in the form of a rose, and reddish stamina, like those of the pear-tree. The fruits, or haws, are a little larger than Myrtle-berries, are red when ripe, and hang in bunches. They have a black navel, and are full of a clammy, soft, sweetish pulp, wherein are two hard white stones. It grows every where in hedges, and flowers in May; the berries grow ripe in September, and continue a great part of the winter, when the leaves are falling off.

MESPILUS PYRIFOLIA, *five PYRICANTHA*, the *ever-green Thorn*, is a thorny shrub, covered with a blackish bark, whose branches are armed with thorns, whereof some are an inch in length, and others shorter. The leaves resemble those of the wild pear-tree, or rather the almond tree; some are oblong, and a little pointed, while others are almost round, smooth, and dentated on the edges, especially the lowermost. The flowers consist of several petals, of a reddish colour, and disposed in the form of a rose. The berries are like those of the hawthorn, and of a golden scarlet colour, growing together in bunches, and furnished with a sort of a crown. The pulp is a little tartish,

and contains four or five whitish yellow seeds, of a triangular shape, and a little shining. It grows in the hedges in Italy, and the southern parts of France; but elsewhere it is cultivated in gardens. It flowers in May, and the berries grow ripe in autumn. Children are very fond of them, and they have the same taste and properties as haws.

MILIMUM, *Millet*, has many fibrous, and strong, whitish roots, that send forth stalks to the height of two or three feet, which have several knobs. The leaves are large, long, and about an inch broad, in the shape of those of reeds; they are covered with a sort of thick down, at the places where they surround the stalk, after which they become smooth; the flowers grow in loose panicles at the top of the stalks, and are generally yellow, though sometimes blackish; they are composed of three stamina, that proceed from the middle of the flower-cup, which generally consists of two leaves. When the flowers are fallen off, they are succeeded by oval grains, that are yellowish or white, hard, shining, contained in three sorts of thin tender shells. These plants were originally brought from the eastern countries, where they are still greatly cultivated, and from whence we have the grain, which is highly esteemed by many for making puddings. It is a common aliment in the eastern countries, where they boil it in milk, and it has the same virtues as rice. It is good in disorders of the breast and obstinate coughs; but it is a little binding and windy.

MILLE FOLIUM VULGARE, *Yarrow*, or *Nose-bleed*, has a woody, fibrous, blackish, creeping root, from whence proceed a great number of stalks, to the height of a foot, or a foot and a half, that are stiff, angular, hairy, reddish, and branched at the top. The leaves are divided and subdivided into a vast number of segments, adhering to a long rib, and have some resemblance to those of camomile; but they are more stiff, and somewhat like the feathers of a bird. The flowers are collected into round umbels, each of which is radiated, whitish, and placed in a scaly cylindric calyx, and are succeeded by very small seeds. It grows in uncultivated sandy places, where the leaves generally lie close to the ground till the stalks begin to rise. It is called *Nose-bleed* by the country people, because a spring of it put up the nose will bring away a little blood. It flowers in May and June, and has an acrid, bitter, aromatic taste. It is a vulnerary plant, and is said to cure wounds, tumours, and inflammations without repulsion.

MYAGRUM, *Gold of Pleasure*, has a fibrous root, a little woody, which sends forth a stalk to the height of a cubit and upwards, from whence proceed several cylindric, strait, slender branches, a little downy, and full of a spongy pith. The leaves are longish, pointed, soft, of a palish green, slightly dentated on the edges, and their bottoms surround their stalk in such a manner, that the sides represent two wings or ears. The flowers consist of four petals, placed in the form of a cross, and of a yellowish colour; the pistil arises out of the calyx, and afterwards becomes a fruit in the shape of a pear, with one cell, including an oblong seed, and two empty cells at the point. It is an annual plant, that decays as soon as the seeds are ripe, and grows wild in several parts of Europe. The oil of these seeds is emollient, and moderately heating, and it is given inwardly in a painful costiveness.

MYRRHIS, *Sweet Cicely*, has a long, thick, white, soft, and somewhat spongy root, with stalks that rise to the height of four or five feet, which are branched, downy, and hollow. The leaves are large, and winged like those of hemlock, but whiter, and often marked with white spots; they are soft to the touch, a little downy, and have the smell of chervil. The flowers grow in umbels on the tops of the branches,

and are composed of five unequal petals, disposed like those of the flower-de-luce. The calyx turns to a fruit, composed of two seeds, resembling the bill of a bird, and are gibbous on one side, but plain on the other. It may be propagated at the beginning of March, by sowing the seeds on a bed of light earth in a shady situation; and when the plants come up they should be transplanted into the like earth in a moist shady situation, about two feet asunder. Some use the leaves as a salad, and think it is as good as common chervil; it flowers in June, and the seed is ripe in July. It is looked upon as a pectoral, and the leaves when dried in the shade, and smoked like tobacco, help those that are troubled with an asthma.

MYRTUS MINOR VULGARIS, *Box-leaved Myrtle*, is a shrub that has a hard woody root, that sends forth a great number of small flexible branches, furnished with leaves like those of box, but much less, and more pointed; they are soft to the touch, shining, smooth, of a beautiful green, and have a sweet smell. The flowers grow among the leaves, and consist of five white petals, disposed in the manner of a rose, and have a calyx cut into five segments. There is a great number of stamina, which have a fine smell, and when the flower is fallen off, the calyx becomes an oval oblong berry, adorned with a sort of crown, made up of the segments of the calyx. The berry is green at first, but grows black when ripe, and is smooth, juicy, and divided into three cells, containing hard seeds in the shape of kidneys. This sort of myrtle is the most common in the gardens of the northern countries, and is propagated from cuttings, the best season for which is in July. The shoots should be six or eight inches long, and the leaves on the lower part should be stripped off above two inches high, and the part twisted which is to be placed in the ground. They should be planted in pots, two inches distant from each other; the earth should be pressed close about them, and there should likewise be some water to settle it. The pots should be plunged in old dung, or tanner's bark, and shaded with mats in the heat of the day, watering them occasionally. In about a month's time they will take root; and, towards the beginning of September, they should be removed to a place sheltered from cold wind, where they may remain a month, and then be removed to the green house. At the beginning of the next April, they should be taken out carefully, and placed in separate pots, with a Ball of earth at the root.

MYRTUS BRABANTICA, *Dutch Myrtle*, is a small shrub, with a hard flexible root, and rises to the height of a cubit or upwards; it has the look of a small willow, for which reason it is called by some Sweet Willow. There are male and female flowers on different plants, and those of the male are oblong, loose, scaly catkins, and in each of the scales there is a flower in the shape of a half moon, but without petals, though there are from five to six stamina. The female flowers have no stamina, but an oval pistil, supported by two styles, which afterwards changes to a berry, containing one roundish seed. It grows plentifully upon bogs in many parts of England, and flowers in May and June; and the seeds grow ripe in July and August. Where this shrub grows in plenty, it is so fragrant, especially after a shower of rain, as to perfume the air at a great distance, during the spring and summer. The leaves have been said to have many virtues, and they are still used in some places to kill worms.

NARCISSO-LUCOIMUM, *Snore-drop*, has a bulbous root, composed of several white coats, except the outermost, which is brown, and underneath there are whitish fibres. It sends forth three, four, or five leaves, like those of leeks, which are green, smooth, and shining; among these arise an angular,

furrowed,

furrowed, hollow stalk, six inches high, cloathed with leaves as far as the middle, which form a kind of white sheath. It generally bears but one flower at the top, though sometimes two, but seldom three. The sheath of the flower is oblong, blunt, compressed, and opening sideways becomes a dry skin; the flower itself has three oval oblong petals, which are spread open, and are equal; the nectarium is seated in the middle, and is cylindrical, blunt, and bordered. The pistil is placed in the center of the flower, attended by six stamina, and afterwards becomes an oval capsula, with three cells full of roundish seeds. They are of two sorts, the single and the double; and they are valued for their early appearance, which is commonly in February. The roots should never be planted single, because the flowers make the best appearance when they grow in bunches. When there are twenty or more roots together, they have a very good effect. The root is of no use in medicine.

NASTURTIIUM HORTENSE, *garden Cresses*, have a single, woody, white root, that is not so acrid as the leaves. This root sends forth several stalks, to the height of a foot, or a foot and a half, that are round, smooth, solid, branched, and covered with a sort of bluish dust, that will readily come off. The leaves are oblong, deeply cut, and have no disagreeable taste. The flowers grow on the tops of the branches, and consist of four petals, placed in the form of a cross, and of a whitish purple colour. The pistil, which rises from the center of the flower-cup, becomes a roundish smooth fruit, divided into two cells, containing small, oblong, yellowish seeds. It is cultivated in gardens as a salad herb, and is in most esteem in the winter, and in the spring. During the winter they must be sown on a gentle hot-bed, covered with mats or glasses; in the spring upon warm borders, and in the summer upon those that are shady. They attenuate and cut gross thick humours, and are good in obstructions of the viscera. It may be eaten plentifully as a salad, and therefore nothing need to be said of the dose.

NASTURTIIUM AQUATICUM, *Watercress, or Cresses*, have a small white root, full of knots, from each of which several capillary fibres proceed, that enter into the water. The stalk arises to the height of a foot, and is crooked, thick, hollowed, furrowed, smooth branched, and of a green colour, with a reddish cast. The leaves are almost round, juicy, of a greenish brown colour, and have a biting agreeable taste. The flowers grow on the top of the stalks, and are small, white, composed of four petals in the form of a cross, with several yellow stamina and apices; these are succeeded by pods, that are a little crooked, and divided into two cells full of roundish, small, reddish seeds, of an acrid taste. It grows on the sides of brooks and ditches, and flowers in July and August. It is used as a salad herb, especially in the winter. When the leaves first appear, they are almost round, but afterwards they are cut like those of rocket. It has much the same virtues as garden cresses, but stronger, and is accounted one of the best antiscorbuticks in these parts of the world.

NEPETA, *Nep, or Cat-mint*, has a woody root, divided into several branches, and sends forth a stalk three feet high and upwards, which is square, hairy, branched, reddish near the ground, and the upper part whitish; the branches are always produced opposite to each other by pairs; the leaves are like those of the nettle or betony, and are serrated on the edges; they are pointed, downy, whitish, and have long pedicles, and have a strong smell of mint, with a biting acrid taste. The flowers grow on the tops of the branches, where they are collected into six spikes; they are purple or whitish, and they each consist of a tube, whose upper lip is cut into two segments, and

the lower into three; the middle segment is broad and hollowed like a spoon, and elegantly crenated on the edges; it is sustained by a calyx, in the shape of a horn, and succeeded by four naked oval seeds. It is called cat-mint, because the cats will not suffer it to grow, and is propagated by sowing the seeds in March, in beds or borders of common earth; but it is found wild in many parts of England. It is aperient, has all the virtues of common mint, and may be drank in the manner of tea. When the cats eat too much of it, it will make them drunk; but, what is very remarkable, if it be raised from seeds the cats will not touch it.

NICOTIANA MAJOR LATIFOLIA, *the greater broad-leaved Tobacco*, has a white fibrous root, which sends forth a stalk to the height of five or six feet, as thick as one's thumb, and round. It is hairy, and full of a white pith. The leaves are large, without pedicles, and placed alternately on the stalks by their large appendages; they are hairy, full of nerves, a little pointed, clammy to the touch, and of a pale green, inclining to yellow. They are divided into several branches at the top, that support flowers in the shape of a bell, divided into five deep segments, as well as the calyx, which expand like a star. They are of a purple colour, and the apices of the stamina are sprinkled with a fine powder of an ash colour. The embryo becomes an oblong, roundish, membranaceous fruit, divided into two cells full of reddish seeds, that are exceeding small, in proportion to the bigness of the plant. It is a summer plant with us, though it will sometimes, in moderate winter, continue all the year. It is known by the American planters, under the title of *Oroonoko Tobacco*; but it is not in such esteem with the English, as the other sorts. In Brasil it flowers continually, and will live ten or twelve years.

NICOTIANA MAJOR ANGUSTIFOLIA, *the greater narrow-leaved Tobacco*, differs only from the former in their leaves, which are narrower, and more pointed, and are fixed to the stalk by pretty long pedicles.

NICOTIANA MINOR, *the lesser, or common English Tobacco*, has a single thick root, sometimes divided into several tender white fibres, and sends forth a stalk to the height of two feet, which is hairy, solid, sometimes as thick as one's finger, branched, and clammy to the touch. The leaves are rounder than those of the former sorts, and are placed alternately on the stalks; they are flat, blunt at the end, of a greenish brown, and have short pedicles. The flowers are numerous on the top of the branches, and are divided into five segments like the former; they have five stamina, whose apices are of an ash colour, as well as the pistil; they are less than those of the former kind, and the colour is of a greenish yellow. The calyx is hairy, clammy, and divided into five parts. The flowers are succeeded by roundish capsula, in the form of a navel, and, when ripe, open into two parts, and are full of a vast number of yellow tawny seeds. Besides these, there are other sorts, as *the greater narrow-leaved perennial tobacco*; *the lesser tobacco with larger and rougher leaves*; *the great broad-leaved tobacco with white flowers*, and a *short seed vessel*; *the dwarf tobacco with a primrose leaf*; and *the small tobacco with a leaf in the shape of a heart*, and a *flower with a longer tube*. The first of these sorts is most common in England, and is generally raised by the gardeners near London. They were all brought originally from America, and at first were in high esteem for their medicinal qualities. It is called tobacco from the island of Tobago, from whence it was brought in the year 1560.

The taste and smell of tobacco is well known, as well as its common use. Some use it as a vomit, which should be never done, except in cases of necessity. The watery extract made by long boiling, and

and preserved dry, has a cleansing anodyne quality, and is excellent for appeasing an asthmatic cough. It may be taken in broth, or with a stomachic remedy to four or five grains. In some delicate constitutions, it will occasion a retching to vomit, which may be easily remedied with a draught of burnt wine. Outwardly, the plant is cleansing and healing, and will soon cure malignant ulcers, when other things fail. Some make an ointment of tobacco for the killing of lice, but it should be used very cautiously. When it is beaten into a cataplasm with vinegar or brandy, it will remove hard swellings of the liver and spleen, as we learn from the Edinburgh essays. Some recommend the smoking tobacco in the time of the plague, and other infectious diseases. We know an instance of the efficacy of smoking tobacco in a person, who was thereby cured of a dry asthma, when all other remedies had failed. Having smoked part of a pipe, merely for good company sake, he found such an abatement of his cough, as induced him to pursue it, which at last effectually cured him, by gradually bringing off his lungs the coagulated matter, with which they were clogged. However, this may not succeed in every constitution; and it will be prudent not to continue it, if after once or twice smoking, the patient has not some substantial encouragement to proceed, which may compensate for the sickness tobacco always occasions those, who are not used to smoking it.

NIGELLA ROMANA, *Roman Fennel-flower*, has a root with many furrowed slender stalks, a foot in height; the leaves are pretty large, green, and cut into slender segments. The flowers are placed at the tops of the branches, distinct from each other, and are composed of five petals, of a pale colour, and disposed in the form of a rose. There are several stamina in the middle, surrounded with a crown, and are succeeded by a membranous fruit, and divided into several cells, that terminate in horns. This plant is cultivated in gardens, and flowers in July, August, and September. The seeds brought from Italy are the best, and should be fresh, large, and of a fine yellow colour or black. It is resolvent, discutient, and strengthening, and is proper for correcting the impurities of the stomach, breast, and kidneys. It is good against catarrhs of the head, the head-ach, arising from thence, the vertigo, and obstructions of the nose, either in fumigations, or snuffed up when powdered. The dose inwardly is from one scruple to a drachm. It is of great use among the Germans, but neglected by us.

NOLI ME TANGERE, *five* **BALSAMINE**, *Balsamine*, has a root that runs level with the ground, and sends forth a stalk to the height of a foot and a half, which is tender, of a bright green, smooth, shining, light, branched, geniculated by intervals, with tuberosities. The leaves are placed alternately, and are deeply dentated on the edges. From the places, where the leaves join to the stalk, there proceed long pedicles, that bend down to the ground, which are divided into three or four branches, on which hang small flowers, with four unequal petals, supported by two small green leaves; but the flower is yellow, representing a kind of a sea-monster, with a small body, and a slender, short, crooked, pointed tail, like an ox's horn, sprinkled with deep red spots; the mouth is wide, and in the middle there are several stamina, of a whitish colour. They are succeeded by long, slender, knotted fruit, of a whitish green, streaked with green lines, bending to the ground. They open as they grow ripe, and when the wind blows a little stronger than ordinary, or by the least touch, they shoot out their seeds, at the same time writhing themselves like worms; the seeds are either ash coloured, brown, or red. Those that are not used to this plant, are always startled

when the seeds burst out in the above manner; and from its not bearing to be touched without this effect, it is called *Noli me tangere*, that is, *touch me not*. It grows wild in some places, and flowers in June, and it is also cultivated in gardens, for the diversion it affords. It is propagated by the seeds, and if suffered to cast them, it will come up every spring without any care; but it delights most in moist shady places. It is very aperient and diuretic, and frees the kidneys from gravel.

NUMMULARIA, *Moneywort*, has a very creeping slender root, and sends forth several long, slender, angular, branched stalks, that creep on the ground, and whose leaves are placed in pairs opposite to each other; they are about as broad as one's finger, and are almost round, though a little curled, and of a yellowish green; where the leaves join to the stalk, the flowers proceed, which are large, and consist of a single petal, cut into the shape of a rose. On some branches there are three leaves, and as many flowers at each knot. They are succeeded by small round fruit, containing seeds hardly visible. It is called moneywort from its roundness of the leaves, and is common in moist places, and by the sides of ditches. It begins to flower in May, and continues to do so most of the summer. The leaves are astringent and vulnerary, and proper to stop hæmorrhages, both inwardly and outwardly. The dose of the juice is from one ounce to three, and, in decoction, from one handful to three. Boerhaave recommends it greatly against the hot scurvy.

NYMPHÆA ALBA, *white Water-lily*, has a long root, as thick as one's arm, and sometimes as the leg, full of knots of a brown colour without, and white within; it is fleshy, spongy, full of clammy juice, and adheres at the bottom of the water to the earth, by several fibres. It sends forth large roundish leaves, in the shape of a heart, that are thick, fleshy, veinous, and of a whitish green colour on the top, and of a brownish green beneath, and swims on the surface of the water; these are supported by long pedicles, as thick as a child's finger, which are cylindric, reddish, tender, juicy, and spongy. The flowers are large and broad when blown, consisting of several leaves, disposed in the form of a rose, of a fine white colour, but of little or no smell. The flower cup consists of five whitish leaves, and there are other leaves on the edges, of a whitish green colour. There are a great number of stamina, with a pistil that turns to a globular fruit, like the head of a poppy, divided into several cells, full of oblong, blackish, shining seeds. It grows wild in marshes and standing waters, and flowers in May and June.

NYMPHÆA LUTEA MAJOR, *the great yellow Water-lily*, differs from the former, in having leaves not quite so round, and in the flower, which is yellow, besides which the fruit is of a conical shape, and contains larger seeds. It is found in the same places, and flowers at the same time as the former. The roots have both the same virtues, and have a clammy bitterish taste. They are proper in heat of urine, want of rest, and all internal inflammations, but are now seldom used. The powder of the dried root is given from a scruple to a drachm.

OLEA MAJOR, *five* **HISPANICA**, *the manured Olive tree*, has a trunk that is knotted, and more or less high, with a smooth ash coloured bark, and yellowish wood, that has somewhat of a bitter taste. The leaves are oblong and narrow, almost like those of willow; they are pointed, thick, fleshy, hard, of a greenish yellow above, and whitish below, but without down; they have very short pedicles, and are generally placed by pairs opposite to each other. The flowers proceed from the places where the leaves are joined to the stalks, and grow in whitish branches, like those of the alder; they consist of a single petal,

the

the lower part of which is hollowed, and the upper is divided into four parts; the embryo of which is fixed in the center of the flower cup, and becomes an oval, green, fleshy, succulent fruit, of different sizes; for in Spain it is as big as a middling plumb; whereas in Italy and Languedoc, it scarce arrives at the size of a common acorn. This is the olive, which is at first green, then yellowish, and at length blackish, when it is full ripe; though there are some in Spain that turn white. They are oily, have an acerb disagreeable taste, and contain an oblong stone, which is very hard, and within it is a kernel of the same shape. It is cultivated in the southern parts of Europe, and delights in dry, marly places, that are exposed to the south or east; and it flowers in June and July. This tree continues a long time, and the wood which has a fine smell, will burn as well green as dry. They produce a large quantity of fruit, of which they make oil-olive, or salad-oil, well known all over Europe. They are planted out of curiosity in England, in pots or cases, but must be removed into the green-house all the winter. There are several sorts of olives that differ in shape, colour, size, and juice. They are pickled, and then become agreeable to the taste; and are well known in England by the name of pickled olives; they are then said to create an appetite, and strengthen the stomach.

ONOBRYCHIS, *Cock's-head*, or *Sain-foin*, has a long, hard, woody root, black without, and white within, which sends forth several strait strong stalks, about a foot in height, and of a reddish green colour. The leaves which are like those of vetches, but smaller, are green above, white and downy below, pointed, and placed by pairs on one side. The flower is papilionaceous, and the pistil rises out of the downy flower cup, which afterwards turns to a crested pod, in the shape of a cock's-comb, and is rough, with prickles; each of these contain a seed, in the shape of a kidney, which has a pretty good taste when it is green. *Sain-foin* is a French word, which signifies wholesome hay, and is so called, because it is thought to fat all sorts of cattle the soonest of any other. The hay made of it is accounted among us the best sort of food for most cattle, especially in the spring, there being no danger attending it, as there is in clover; it breeds abundance of milk, and the butter that is made of it is very good. There is a sort with a deep red flower, which, when disposed in the large borders of pleasure gardens, afford an agreeable variety; for they are of a beautiful colour, grow in long spikes, and continue a great while. Some observe, that if *Sain-foin* be carefully gathered, well dried, and kept in boxes, it has the smell of tea, inasmuch that it has been mistaken by good judges for green tea; but then it must be gathered before it flowers.

OPULUS, *five* **SAMBUCUS AQUATICA**, *Marsh elder*, or *Gelder-rose*, has a thick, firm, white root, that sends forth a stalk to the height of five or six cubits, divided into several branches, like those of the elder tree, and is knotted by intervals; it is covered with a smooth ash coloured bark or rind, is full of white spongy pith; and is very tender and brittle. The leaves proceed from the knots, and are large, angular, and like those of the maple tree. The flowers consist of a single petal or leaf, divided into five parts at the top, and expanded in the form of a rose. Those about the circumference of the umbel are larger than the rest, and of a fine white, with a calyx that proceeds from the middle of the cup, but they are barren. Those in the middle or centre are smaller, open later, and in their bottom there is a hole that receives the point of the calyx, and they are of a yellow colour. This turns to a berry a little larger than that of the common elder, which is soft and red when ripe; in each of these

there is a flat red seed in the shape of a heart. This shrub delights in moist woods, and on the banks of rivers, and it flowers in May; but the berries are not ripe till autumn, and they continue all the winter. There is another *Gelder-rose*, that differs from the former, only in having the flowers collected into a globe, and is common in old gardens in most parts of England. At a distance the flowers resemble snow-balls, for which reason it is called in some countries the *Snow-ball tree*. It is of no use in medicine.

ORCHIS, *feu* **SATYRIUM**, *Fool-stones*, has a root composed of two tubercles almost round, which are fleshy, and of the size of nutmegs; whereof one is full and hard, and the other wrinkled and spongy. At first it sends forth six or seven leaves, that are long, pretty broad, smooth, and like those of the flower-de-luce, but smaller, and generally marked at the top with brownish red spots. The stalk rises to the height of a foot, and is round, streaked and encompassed with one or two leaves; on the top there is a long spike of beautiful purple flowers, that are whitish towards the center, and sprinkled with specks of a deeper purple. Each flower is composed of six unequal petals, of which the five uppermost compose a sort of helmet; and the lower petal, which is larger than the rest, has a sort of a head or helmet at the top, and terminates in a tail, or sharp point like a spur. The calyx becomes a fruit, with three sides, and is divided into three cells, containing many small seeds. It flowers towards the end of April, and the beginning of May, and is found in many parts of England.

ORCHIS LATIFOLIA, *feu* **MAJOR**, *Dog's-stones*. This plant has a root composed of two bulbs, or fleshy tubercles, but larger, and in the shape of large olives. The stalk rises near the height of a cubit, and has long pyramidal flowers at the top, which are large and beautiful, whitish within, and sprinkled with purple spots; but they are reddish on the outside, and represent a man in armour, without hands or feet. The leaves are big, long, and broad, and are roundish at first when they rise out of the earth in November. The seed is like that of the former, and flowers in May. There are several other sorts of these plants, the under part of whose flower represents several shapes, as a naked man, a butterfly, a fly, a drone, a pigeon, an ape, a lizard, and a parrot; and these all grow wild in several parts of England; but deserve a place in every good garden. The Turks have a preparation of a certain root that is called *lalep*, which they make use of to recover their strength. It is supposed to be a kind of orchis, and the following preparation of this root will answer the same purposes. Take the roots or bulbs of orchis, that are well nourished, and after they are skinned, throw them into cold water; after they have been there some hours, boil them in a sufficient quantity of water, and then strain them; this done, put them on a string, and dry them in the air; this is best done in a dry hot season. They will become transparent, very hard, and will resemble pieces of gum tragacanth. If they are kept in a dry place they will always remain good, and may at any time be reduced to a very fine powder. A scruple of this, put by little and little into boiling water, will entirely melt, and will be sufficient for a pint of water; it may be rendered more agreeable, by putting in a little sugar, and is exceeding useful when mixed with milk, in all diseases of the breast; for it is very emollient, and will abate the sharpness of the humours; it is excellent in consumptions, and bloody fluxes of the bilious kind.

OREOCELINUM, *feu* **APIUM MONTANUM**, *Mountain Parsley*, has a root consisting of many fibres, adhering to one head, which creep greatly in the earth; they are blackish on the outside.

side, white within, and are full of mucilaginous juice. It has a single ferulaceous stalk, that rises to the height of four or five feet, which is furrowed, and divided into wings. The leaves proceed as well from the root as the stalk, and are large, but like those of the common parsley, only they are more firm and smooth. The flowers grow in umbels at the top of the stalks and branches, and are small, whitish, and consist of five purplish petals, disposed in the form of a rose. These are succeeded by a fruit, which was the calyx of the flower, composed of two seeds, that are oval, flattish, radiated on the back, and bordered with a membranous leaf, of a reddish colour. It grows in mountainous places, where there are pastures.

OREOCELINUM, *five* **APIUM MONTANUM MINUS**, *smaller mountain Parsley*, has a pretty thick, soft root, that is fibrous on the upper part, and white both within and without; the stalks rise to the height of a cubit and upwards, and is pretty thick, firm, furrowed, knotted by intervals, reddish and branched. The leaves lie on the ground, and are like those of garden parsley. The flowers grow in umbels on the top of the stalk and branches, and are of a white colour. The seeds that succeed them have a more acrid taste than the leaves. It delights in mountainous and sandy places, and flowers in July and August. The seeds are accounted an aperient, and proper to open the obstructions of the liver and spleen; they are also diuretic, and free the kidneys from gravel; but they are seldom used among us.

ORIGANUM VULGARE, *wild Marjoram*, has a slender, woody, fibrous root, creeping obliquely into the ground, which sends forth several stalks, that rise to the height of two or three feet, and are hard, square, and downy. The largest leaves resemble those of common calamint, and the lesser those of marjoram; they are downy, have an agreeable smell, and an acrid, aromatic taste. The flowers are collected into scaly spikes, and are labiated, consisting of a single petal, whose upper lip is erect, roundish, and divided into two segments, but the lower into three. The pistil arises from the calyx, and is fixed in the back part of the flower like a nail; it is attended with four embryoes, and turns into as many small seeds, contained in a capsula, that was the calyx of the flower. It grows wild on dry chalky hills, and on gravelly soil, in several parts of England, and it flowers in the summer. Wild marjoram is diuretic, and diaphoretic, and may be used in the manner of tea in the asthma, and a violent cough. The powder of the leaves and the flowers dried in the shade are cephalic, and being taken as snuff, will make the nose run considerably. It helps digestion, discusses wind, and is employed externally in baths for the feet.

ORNITHOPODIUM MAJUS, *the greater Bird's-foot*, has a small, white, single, fibrous root, accompanied with several grains or tubercles, with several flexible, weak, branched, round, hairy stalks, that seem to creep on the ground. The leaves are less than those of the Bastard Sena, and the flowers are small, papilionaceous, and disposed in spikes on the top of the branches; the pistil arises out of the calyx, which afterwards becomes a hooked jointed pod, that is generally undulated, and at every joint there is a round seed; and several of these pods grow together in such a manner, as to resemble the foot of a bird. It flowers in summer, and generally in June, and delights in dry cultivated places. The whole plant is accounted aperient and diuretic, and when powdered, the dose is a drachm in a glass of white wine; but it is not now in use.

ORYZA, *Rice*, has a root like that of wheat, and furrowed stalks, that rise to the height of three or four feet, which are thicker and stronger than those

of wheat or barley, and knotted by intervals. The leaves are like those of reeds in shape, but they are fleshy like leeks. The flowers which grow on the tops are of a purple colour, and are disposed into panicles. The seeds are almost oval, white, transparent, hard, and are contained in a yellowish, rough, furrowed, angular, downy capsula, somewhat like barley; they are placed alternately on each side of the branches. This plant is cultivated in hot countries, in moist marthy land, and the use of the seeds is principally for food. However, they destroy the acrimony of the humours, and are good in fluxes of the belly. Rice serves instead of bread in most of the eastern countries, and is their principal nourishment. It is now planted in South Carolina, where great quantities have been produced, and as good as in any other part of the world. It is chiefly used here for puddings, and to make rice-milk.

PÆONIA MAS, *Male Peony*, has an oblong, thick, tuberose root, brown without, and pale within, and is often divided into several branches; it sends forth stalks to the height of two or three feet, that are a little reddish, and divided into branches. The leaves are large and composed of several other leaves, almost like those of the hazel tree; but they are broader and thicker, and of a shining, brownish green colour; they are also covered underneath with a down, and have long reddish pedicles. The flowers grow on the tops of the stalks, and are large, consisting of several petals, that expand in the form of a rose, sometimes of a purple colour, and sometimes of a palish red. The calyx is composed of five leaves, and in the middle there are purple stamina with saffron coloured apices. They are succeeded by fruit, composed of several small, white, downy, shining, crooked horns, that are open when they are ripe, and contain many globulous seeds, that are red at first, and afterwards of a dark blue or black. It flowers at the beginning of May, and they fall off soon afterwards. It is cultivated in gardens for the sake of the roots, which are used in medicine. They are propagated by parting the roots, and are extremely hardy, for they will grow in any soil or situation: the best season for this is in the beginning of September.

PÆONIA FÆMINA, *female Peony*, has a root composed of several tubercles, connected together with fibres, and sends forth a tall stalk, that has scarce any redness at all; the leaves are of a greenish pale colour above, and whitish, and a little downy underneath. The flowers are like those of the former, but neither they nor the fruit are so large. This is a very common sort, and is to be met with almost every where in gardens. The *Male Peony* is principally used in medicine, and the roots and seeds have been thought by many to be a specific against the falling-sickness, convulsions, and the palsy. They are reduced to powder, after they have been dried in the shade, and then the dose is a drachm or two; or an ounce of the roots is given in decoction, while they are fresh.

PALIURUS, *Christ's-thorn*, has a hard woody root, with a stem that grows so high, that it sometimes deserves the name of a tree. The branches are long and thorny, but those that are near the leaves are smaller, and not so prickly as in other places. The leaves are almost round, pointed, and of a dark green, with a reddish cast. The flowers are small, yellow, grow on the tops of the branches, and are generally composed of five petals, in the form of a rose. The pistil arises from the flower cup, which turns to a fruit almost in the shape of a bonnet, having a shell that is nearly globular, divided into three cells, on each of which there is a single roundish seed. This shrub grows wild in the hedges of Italy, Spain, Portugal, and the south of France, from whence its seeds are procured. It flowers in May and June,

and the fruit is ripe in the autumn. It is called *Christ's-thorn*, because they suppose his crown of thorns was made of the branches of this tree. It may be propagated by laying down the tender branches in the spring, which will take root in a year's time; the best season for transplanting them is in autumn, soon after the leaves begin to decay. The fruit is said to be diuretic, and to help the moist asthma, by promoting expectoration; but it is not in use among us.

PAPAVER CORNUTUM, seu CORNICULATUM, *Yellow horned Poppy*, has a root as thick as one's finger, which is long, blackish, and full of a yellow juice, as well as all the plant, which has a particular taste and smell. It sends forth long, fleshy, thick, downy leaves, cut deeply on the sides, and dentated on the edges; the colour is of a sea-green, and they lie upon the ground, where they continue all winter. The stalk, which does not rise till the second year, is strong, solid, knotty, smooth, and divided into several branches, sending forth leaves from the knots that are smaller, and not so jagged as those below. The flowers grow on the top of the stalks and branches, and are as large as those of garden poppies, being each composed of four yellow petals, placed in the form of a rose, in the middle of which there are a great number of stamina of the same colour. They are succeeded by fruit, or a sort of pods, a span in length, or longer, and are very slender and crooked like horns; they are rough to the touch, blunt at the ends, and contain a double row of seeds, separated by a partition, and as round as those of the common poppy, and very black. It grows wild on the sea-shore, and in sandy maritime places. If it be sown in gardens in autumn, it will come up in the spring, and will flower in June and July, and the pod will be ripe in August. This plant is accounted diuretic, and very good for those who make thick urine: in Portugal they give an infusion of half a handful of the leaves in a glass of white wine for the gravel and stone; but it has not been brought into use in England.

PAPAVER RHÆAS, the greater wild Poppy, or Cornrose, has a single white root, as thick as one's little finger, furnished with a few fibres, and has a bitter taste. It sends forth several stalks, to the height of a cubit, or upwards, which are round, solid, hairy, and branched; the leaves are jagged like those of succory, hairy, of a brownish green, and dentated on the edges. The flowers grow on the top of the stalks and branches, are composed of four large, thin, deep, red leaves, which are ready to fall off with each blast of wind; these are succeeded by small heads of the size of hazel nuts, that are oblong, smooth, and much of the same shape with those of the garden poppy. They are divided into several cells, containing blackish, or dark red seeds. This plant grows almost every where in the fields, especially among corn. It flowers in May, June, and July. The flowers are made use of in medicine, and are in some measure anodyne and narcotic. They are good in acrimonious catarrhs, roughness of the face, and in commotions of the fluids. They may be drank as tea, and are of very great service in all cases where a gentle opiate is useful; there is a syrup made with these flowers, kept in the shops, which will serve for the above purposes.

PAPAVER HORTENSE NIGRO SEMINE, *the lesser Garden Poppy*, has a root about the thickness of one's little finger, full of a bitterish milk, as well as the whole plant. It sends forth an upright stalk, to the height of two cubits, which is generally smooth, though sometimes a little hairy, and the leaves are oblong, broad, dentated, curled, and of a sea green colour. The flowers grow on

the top of the stalks and branches, and are large, in the shape of a rose, of a reddish colour, sometimes single, and sometimes double; as also sometimes fringed on the edge, and sometimes not. The calyx consists of two leaves, that generally fall off as soon as the flower is blown. It is succeeded by roundish heads of different sizes, crowned with a sort of cover, in the form of a star, and contains in their cavities or membranous cells, seeds of a blackish colour. There is a great variety of these plants, as well in colour as shape, that are sown in gardens for the sake of their flowers; but they are not so much used in medicine as the white poppy. They may be all propagated by the seeds sown in autumn, and will flower in May and June, and sometimes during all the summer.

The heads of the stalks of these plants contain a milky juice, which may be collected in a considerable quantity, by slightly wounding them when almost ripe; this, exposed for a few days to the air, thickens into a clammy mass of the same quality as opium, but weaker. Poppy heads boiled in water communicate their virtues to it very freely; and, when the liquor is strongly pressed out, clarified with the whites of eggs, and evaporated to a due consistence, yields an extract that weighs about one sixth of the weight of the heads. Some count it more safe than opium, but it must be given in a double dose.

PARIETARIA, Pellitory of the wall, has a fibrous reddish root, with several stalks that rise to the height of two feet, which are round, reddish, brittle, and branched. The leaves are oblong, and are pointed, downy, of a brownish green colour, shining, rough, and apt to hang to the cloaths of passengers; they have long pedicles, and are placed alternately on the stalks. The flower has no petals, but has generally four stamina, that rise out of a flower-cup, divided into four parts, which is sometimes in the shape of a bell, and sometimes like that of a funnel; they surround a pistil that generally turns to an oblong seed, contained in a capsula that was in the cup of the flower. It grows upon old walls and buildings in great plenty, and flowers in May. It is looked upon as aperient, temperating and resolvent, whether taken inwardly or applied outwardly. The dose, in infusion, is from one handful to three, and of the juice from one ounce to three. It is accounted one of the five emollient herbs, and is made use of occasionally for that intention, particularly in decoctions, fomentations and clysters.

PASTINACA, Parsnep, or the Garden Parsnep, has a long, thick, fleshy root, of a yellowish colour, in the middle of which there is a nerve, that runs throughout its whole length. The stalk rises to the height of three or four feet, and is upright, firm, furrowed, hollow, and branched. The leaves are large, and composed of other leaves, that are villous, dentated on the edges, winged, and are placed on a pretty large rib; they are of a brownish green, and placed by pairs along the rib, which is terminated by a single leaf. The flowers grow on the tops of the stalks and branches in large umbels, and each flower has four yellow petals, placed in the form of a rose; these are succeeded by large, oval, flattish, slightly furrowed seeds, bordered by a small membranous leaf, resembling those of angelica. The root of this plant is of great use as food, for which it is chiefly employed. It flowers in July and August, the second year, after it has been sown. The taste of parsneps is well known, and they are more nourishing than carrots, though some have a natural aversion to their use.

PASTINACA SYLVESTRIS, wild Parsnep, has a white single root, that has sometimes large fibres, and has the same taste and smell as the garden parsnep. The stalk is two or three cubits high, and is upright,

upright, stiff, furrowed, hairy, hollow within, branched, and has leaves alternately placed like the former; but they are smaller, of a deeper green, and are sometimes hairy, especially towards the root. The flowers grow in umbels, and are small, yellow, and composed of five petals each; these are succeeded by double seeds, as in the former. It grows in uncultivated places, in dry fields, and upon hills, and flowers in the summer. Some make use of it as an aliment, and pretend, when the seeds are sown in the garden, they will produce as good parsneps as the garden sort. Both the seeds and root have been commended as a remedy against agues; but they often fail.

PERIPOLCA, *Virginian silk*, or *climbing dog's bane*, of Montpellier, has a root almost as thick as one's finger, that is long, white, fibrous and creeping; as also full of milky juice, as well as the rest of the plant. The stalks rise to the height of two cubits, and are slender, round, branched, pliant, and creep upon any tree that stands near it. The leaves stand opposite to each other, are large, thick, whitish, pointed, and cut in the form of a cross, near the pedicle, and are full of a milky juice. The flowers proceed from the places where the leaves join to the stalk, consisting of a single petal that is white, and cut into five segments in the form of a star. The pistil is succeeded by a fruit, so like that of dog's bane, as not to be distinguished from it; and when it is opened, it discovers a downy substance, under which the seeds lie. It grows wild about Montpellier, but with us it is propagated in gardens, by laying down the branches at the spring of the year; it flowers in June, July and August; and the milky juice being inspissated over the fire, becomes blackish, and greatly resembles scamony, but is not so purging; and therefore requires a large dose to procure that effect.

PERSICARIA MITIS, *dead or spotted Arse Smart*, has a slender, oblique, woody, fibrous root, difficult to break, and sends forth stalks to the height of a foot, that are round, hollow, reddish, branched and knotted. The leaves are like those of the peach-tree, and sometimes marked with blackish spots. The flowers grow in spikes, and consist of single petals, cut into five segments, and are without a calyx; but there are five stamina that are purple and shining, though sometimes whitish; they are succeeded by oval, flattish, pointed, smooth, blackish seeds. It has not so acrid a taste as the following, and is a little tart. It grows in watery, marshy places, as well as in moist ditches, almost every where, and flowers in July and August. It is looked upon as astringent, deterfive, and vulnerary, and its decoction is said to be good in fluxes of the belly, and for ulcers of the intestines.

PERSICARIA URENS, *biting Arse Smart*, has a small, single, woody, white, fibrous root, that sends forth several stalks to the height of a foot and a half, which are firm, round, smooth, knotty, branched, sometimes reddish, and sometimes of a greenish yellow. The leaves proceed from the knots of the stalk, which they embrace by their membranous appendages, and are of a pale green, and like those of the peach-tree. The flowers grow in long spikes on the top of the stalk and branches, and consist of a single petal, cut into five segments; there is no calyx, but there are five stamina generally of a purple colour, which are succeeded by pretty large seeds, somewhat triangular, shining and blackish. It has an acrid biting taste, like pepper, and grows in watery marshy places on the sides of brooks and ditches; it flowers in July and August. It is said to be cleansing and vulnerary, and to be good in the dropsy, jaundice, and obstructions in the viscera. Its distilled water, given

to two or three ounces, is by some accounted a specific against the gravel. All authors agree, that this herb, applied to old ulcers, eats away proud flesh, and cleanses and dries them; being applied as a cataplasm to the bruises of horses; it resolves the coagulated blood; if the wounds and ulcers are washed with the juice, the flies will never come near them.

PERVINCA, *five* **CLEMATIS DAPHNOIDES**, *Periwinkle*, has a fibrous root, with slender, long, round, green, knotty, creeping, climbing stalks; the leaves are oblong, green, smooth, and placed by pairs, opposite to each other, and are of a bitter styptic taste. The flower cup consists of a single leaf, divided into five long, narrow segments; and the flower of a single petal is cut into five segments, that expand into the form of a salver. The pistil is fixed in the lowest part of the flower, like a nail, and turns to a fruit composed of two husks or pods, which contain oblong, cylindrical, furrowed seeds. Some call it Ground Laurel, because its leaves resemble those of that tree. This plant is an evergreen, and is propagated by the branches that take root in the earth. It flowers in the spring, and continues to do the same for a long while. It is accounted vulnerary, and is found almost every where, in hedges, and among shrubs.

PERVINCA LATIFOLIA, *five* **FLORE CÆRULEO**, *greater Periwinkle*, with a blue flower, has a fibrous creeping root, with several thick, round, knotty, green, creeping branches. The leaves are placed by pairs, facing each other, along the stalks, and are of a shining green, with a bitter acrimonious disagreeable taste. The flowers, like the former, are generally blue, though sometimes white and without smell; it differs from the former only in being larger in all its parts. It is said to be vulnerary, astringent, and febrifuge, and is given to abate all kinds of bleedings.

PETASITES, *Butter Bur*, has a thick, long root, brown without, and white within; the stalks are thick, hollow, and hairy, and rise to the height of half a foot; the leaves are small, narrow, and pointed; and the flowers grow at the end of the stalks in tufts, and consist of many florets, divided into several parts; they are contained in a cylindrical calyx, cloven almost down to the bottom, into many segments. There is a single embryo that becomes a seed, furnished with down. The flowers appear before the leaves, which are very broad, and have a hollow in the middle, and round that a hollow expansion in such a manner, that they resemble bonnets. It grows in moist places on the sides of rivers, brooks, lakes, and ponds, and flowers early in the spring. In some places, the leaves grow to the height of a man, and continue all the winter. Some authors have confounded this plant with the great burdock, because the leaves have some resemblance to each other. The root, which is the part made use of is aperient, resolvent, hysteric, and vulnerary, and brings up phlegm in asthmas and obstinate coughs.

PETROSELINUM, *Parsley*, has a single root as thick as one's finger, and often much thicker, that is furnished with a few fibres; it is whitish, long, and good to eat. The stalks sometimes grow to the height of three or four feet, and are round, furrowed, knotted, and branched. The leaves are composed of others that are cut into jags, are green, and have long pedicles. The flowers grow on the top in umbels, and are composed of five pale petals, disposed in the form of a rose; these are succeeded by seeds that are joined by pairs, and are slender, furrowed, grey, and roundish at the back. It is cultivated in gardens, and will endure all sorts of weather. It delights in a moist ground, for which reason it should be often watered. It sends forth

a stalk

a stalk the second year after it is sown, flowers in June and July, and the seed is ripe in August. It is aperient, and is said to open obstructions; but its chief use is only as a kitchen herb. The seed is one of the four hot seeds, is attenuating and diuretic, and is said to be good in the gravel and dropsy.

PETROSELINUM MACEDONICUM, *Macedonian Parsley*, has a long, thick, white, wrinkled, woody root, which sends forth a stalk to the height of a foot and a half, that is thick, hairy, and branched. The leaves resemble those of garden parsley; but are more large, a little more cut, and dentated. The flowers grow on the top of the branches in umbels, are whitish, and composed of five petals in the form of a rose. They are succeeded by slender, hairy, oblong, aromatic seeds, of an acrid taste. It grows wild in Macedonia, and was greatly valued by the ancients; but is here cultivated in gardens. The seed only is in use, and has the same virtues as that of common parsley, but stronger, and is an ingredient of Venice treacle.

PHASEOLUS, the *Kidney bean plant*, has a slender, fibrous root, and sends forth a long, round, branched, climbing stalk. The leaves come out by threes, in the manner of trefoil, and are large, pointed at the end, fleshy, smooth, and almost like those of ivy, with long, green pedicles. The flowers are papilionaceous, and a pistil rises out of the flower cup, which turns to a long pod full of seeds, generally shaped like a kidney. The use of kidney beans is well known, and therefore need not be mentioned here. They are opening, emollient, resolvent, and promote urine, and generally agree with most constitutions. The meal of the seed is sometimes mixed in emollient cataplasms.

PHILLYREA, *Mock Privet*, has a thick strong root that runs deep into the ground, and the stems rise to eight or ten feet high, and are covered with a white or ash coloured bark, a little wrinkled. It is an ever-green shrub, with leaves like those of the privet, and a flower that consists of a single petal in the shape of a bell, cut into four parts at the top; the colour is a whitish green or herbaceous. The pistil that rises from the center of the calyx afterwards turns to a spherical fruit or berry, that is black when ripe, and contains one seed. They have been formerly in great request, for hedges and to cover walls; but they are most proper for wildernesses. It flowers in May and June, and the fruit is ripe in September. It is of little or no use in medicine.

PHYTOLLACA, *American night shade*, has a root a foot long, that sometimes grows to the thickness of a man's thigh, which is white, and perennial. The stalk rises to the height of five or six feet, and is thick, round, strong, reddish, and divided into several branches. The leaves are placed irregularly, and are large, veinous, soft, and of a pale green, though sometimes reddish; the shape is like those of common night shade. The flowers grow in bunches, each of which consists of several petals, placed in a circular order, which are of a pale red colour. The pistil rises from the center, and the flower is succeeded by a soft fruit or berry, that is roundish, full of juice, and like a button flattened above and below; when it is ripe, it is of a brownish red colour; and contains several round black seeds, placed orbicularly. It is very common in our northern American plantations, and is cultivated in England, for the beauty of its flowers. It may be propagated by sowing the seeds in the spring, upon a bed of light rich earth; and when the plants are come up, they should be moved into the borders of large gardens, allowing them room enough to grow, for they will become very large. The berries are full of a purple juice, which gives a fine tincture to paper; but it will not last long.

PILOSELLA, *common Mouse Ear*, has a short, slender root, furnished with fibres, that send out slender, hairy stalks, which creep upon the ground, where they take root again. The leaves are oblong and roundish at the end, like the ears of a mouse, from whence it has its name, and they are covered with hair; they are green above, but downy below, and have an astringent taste. The flowers are only a single floret, of a yellow colour, with a scaly single calyx, which is succeeded by slender, black, downy seeds, in the shape of a wedge. It grows in dry barren land, and on the sides of highways. It flowers in May, June, and July. It is very bitter and accounted astringent, vulnerary, and deterfive. The extract, given to two drachms, is said to be very useful in internal ulcers; likewise eight ounces of the infusion of this plant, in white wine, is boasted of as an infallible remedy against the ague, given an hour before the fit.

PIMPINELLA, *Burnet, or Pimpernel Parsley*, has a round, slender root, divided into several reddish branches, among which are sometimes found certain red grains, which they call wild cochineal, and which are useful in dying. The stalks are red, angular and branched; the leaves are oblong or roundish, dentated on the edges, and placed by pairs on the ribs. The flowers grow on the ends of the stalks, in round heads, and consist of a single petal, divided into four parts, in the form of a rose, and of a purple colour; in the middle there is a tuft of long stamina, the flowers are of two sorts, the one barren, and furnished with stamina, the other fruitful, that have a pistil. This is succeeded by a quadrangular fruit generally pointed at both ends, and of an ash colour when ripe, containing oblong, slender, reddish brown seeds, with an astringent and somewhat bitter taste. It grows wild in many parts of England, particularly on dry chalky land, and on hills and mountains. It is said to be detergent, vulnerary, and diuretic, and some pretend it stops hæmorrhages, as well internal as external, either given in decoction or powder. The dose, in infusion or decoction, is from half a handful to two handfuls, and of the juice, from an ounce to three ounces, or by spoonfuls.

PINGUICULA, *Butter wort*, has a fibrous root, that sends forth six or seven leaves, and sometimes more; they lie upon the ground, are of a yellowish green, and somewhat thick and shining, as if butter had been rubbed over them; they are two inches long, about one broad, somewhat blunt at the extremities, and even on the edges. In the middle a pedicle arises as high as one's hand, at the top of which is a purple violet, or white flower, like that of a violet; but it consists of a single petal, divided into two lips, and sub-divided into several parts; but, at the bottom, it terminates in a spur. It is succeeded by a fruit or shell, whose lower part is inclosed in the calyx, which when open discovers a button, containing several small almost round seeds. It grows in meadows, and other moist and marshy places, and flowers in the spring. It is vulnerary, and heals green wounds very soon; and the juice makes an excellent liniment for chaps of the nipples.

PIPER INDICUM, *five CAPSICUM*, *Guiney Pepper*, has a short, slender root, furnished on each side with a great number of fibres, which send forth a stalk to the height of a foot and a half, and upwards, especially in hot countries; this is angular, hard, hairy, and branched; the leaves are long, pointed, and broader than those of arse-smart; they are somewhat thick and fleshy, of a greenish brown, and without hair. The flowers, which grow under the joints of the leaves, where they adhere to the branches, are rosaceous, and of a whitish colour, very much resembling those of common

common nightshade, but larger, and supported by a pretty long, fleshy, red pedicle. They are succeeded by a long capsula, as thick as one's thumb, strait, and formed of a fleshy, shining, polished skin, which is green at first, afterwards yellow, and then red; it is divided into two or three cells, that contain many flattish seeds of a whitish colour, inclining to yellow, and generally of the shape of kidneys. It grows naturally in the Indies, and particularly in Guiney and Brasil. It is easily propagated by seeds in hot countries, and there are several sorts of it; as the capsicum with long hanging pods; that with long pods which turn up at the end; the broad leaved capsicum, with long streaked pods, commonly called bonnet pepper; African capsicum, with rough hanging pods; African capsicum, with pyramidal rough pods, generally growing erect; capsicum with long hanging pods that are not hot; capsicum with red pods, in the shape of hearts, generally hanging downwards; capsicum with pyramidal, thick, red pods, generally growing upright; upright olive shaped capsicum; capsicum with small, red pods, growing upright, called Barbary pepper; capsicum with small, round, very hot pods, named bird pepper; American capsicum, with round shaped fruit, broad leaves; American capsicum, with oblong white pods, growing erect, and capsicum with large, rough, red pods, generally hanging downwards. There are two or three other sorts, but these are the principal, and they are sown in many curious gardens, in hot beds. They are pretty hardy, and may be planted abroad about the middle of June. The inhabitants of the West Indies make a great use of the bird pepper, which they dry, reduce to a powder, and mix with other ingredients. They send some of the pots to England, under the name of Cayen pepper, and this is in great esteem by some. They likewise eat the fruits of some of these kind raw, but they will burn the throats of those that are not used to them. The last makes one of the finest and wholesomest pickles in the world, if they are gathered before the skins grow tough. It is at present of no use in physic.

PISUM, the *Pea Plant*, has a slender, fibrous root, that sends forth long, hollow, brittle stalks, of a sea green colour, that would lie upon the ground if they were not supported by props. The leaves are oblong, of the same colour as the stalks, and some are so placed that the stalks seem to run through them, while others grow by pairs on the ribs, that are terminated by tendrils or claspers, which lay hold of every thing they meet with; two or three flowers proceed together from the places where the leaves join to the stalks, and are papilionaceous and white. The pistil is succeeded by a long pod, full of roundish seeds, which are very well known. There are several sorts of peas, as the great garden pea, with white flowers and fruit; the hotspur pea; the dwarf pea, the French dwarf pea; the pea with an esculent husk, the fickle pea, the common white pea, the green rouncival pea, the grey pea, the marble rouncival pea, the rose pea, or brown pea, the Spanish morotto pea, the marrowfat pea, the union pea, the English sea pea, and the pig pea. The English sea pea is found wild on the shores of Suffex, and several other counties in England; and in times of scarcity they have been a very great help to poor people. The propagating of peas is so well known, that the manner of it needs not to be taken notice of here. The use of peas is also very well known, they being common food in all parts of England; but they are windy, and do not very well agree with weak stomachs. Green peas are very good eaten raw, for those that have the sea scurvy.

PLANTAGO MAJOR, great *Plantain*, has a short root, as thick as one's finger, and is furnished with whitish fibres on the sides; it sends forth large

shining leaves, seldom dentated on the edges, and have each eight nerves, that run throughout their whole length. The stalk, which rises from the middle of the leaves to about a foot in height, is round, hard to break, and sometimes reddish, as well as a little hairy. There grows on the top an oblong point, with small whitish flowers; each of these is a pipe, close shut at the bottom, open at the top, and cut into four parts, in which are several stamina. It is succeeded by a fruit, with a thick, oval, pointed shell, that opens crossways, and contains several small, oval, reddish seeds. This plant is very common, and grows almost every where. It flowers in May and June, and the fruit is ripe in August.

There is another sort of plantain, that has a thick root, which seems to be bit off at the end; the leaves are narrower than those of the former, and contain only five nerves; there are likewise a third that contains but three, and this is called the Lesser Plantain. They all have the same medicinal uses, and the leaves are bitter and astringent. It is accounted resolvent and febrifuge; for the juice being given from two to four ounces, in the beginning of intermitting fevers, often cures them. A ptisan, made with the leaves of plantain, is good in the bloody-flux, spitting of blood, and all other hæmorrhages whatever. The decoction is an excellent gargle in ulcers of the mouth; and with lime-water it cures ulcers of the legs. Made into an ointment, with fresh butter, it is said to cure the piles.

POLYGONATUM, *Solomon's seal*, has a long root, as thick as one's finger, and full of large knots or tubercles, of a whitish colour, and furnished with many fibres. The stalks rise to the height of a foot and a half, and are round, smooth, and without branches. The leaves are placed alternately, and are large, oblong, full of nerves, and of a brownish, shining green above, but of a sea-green or bluish colour below. The flowers grow in the places where the leaves join to the stalks, sometimes single, and sometimes double and treble; they are in the shape of a bell, cut at the top into six segments, but they have no calyx; the colour is white, except the edges, which are greenish. The embryo, which is seated on the center of the flower, becomes a berry, like those of ivy; it is a little soft, green, purple, or blackish, and generally contains three large seeds, like those of vetches. It is very common in all parts of England, and grows in shady places by the sides of hedges, and in woods and forests. There are several sorts of this plant, which may easily be propagated, by parting the roots in the spring, before they begin to shoot; they should be planted in fresh, light earth, that is not very rich, where they will thrive exceeding well. It flowers in May and June, and the berries are ripe in August; but the root is chiefly used in medicine. All authors look upon this plant as astringent and vulnerary, and it has been often used for the cure of ruptures; but it is now intirely neglected among us.

POLYPODIUM, *Polypody*, or *Oak Fern*, has a root six inches in length, and almost as thick as a man's little finger, that creeps along the surface of the ground; it is full of tubercles or warts, and is easily broken. It sends forth leaves, which are like those of male fern, but much less; they are deeply cut almost to the rib, into long narrow segments, which are covered on the back with a sort of reddish powder. This, examined through a microscope, appears to be spherical, membranous shells, which open, and let fall small yellow seeds, in the form of a kidney. It is a capillary plant, and consequently bears no flowers; it grows in forests, valleys, and among stones covered with moss, as well as on the trunks of old trees. The root only is used in medicine,

dicine, and that is accounted best that is found upon oaks. It is green all the year, and in April it sends forth fresh leaves. The ancients accounted this root to be purgative; but it does not so much loosen the belly, or at least very weakly. Some affirm, that it opens obstructions of the viscera; but the best authors are not agreed in its virtues, though it has been much used in medicine.

POPULUS NIGRA, *the black Poplar tree*, has a root that spreads very deep in the earth, and grows to a tall tree, with leaves that are almost round, and cut on the edges. They are of a blackish colour, and always tremble, though there is no wind. Some bear no flowers or fruit, except catkins, which consist of many pointed small leaves; for the fruit grows on those trees that bear no catkins, and they consist of several small leaves, under which lies a bell, containing the embryo; this turns to a membranaceous spiked pod, that opens two ways, and is full of downy seeds. In the beginning of the spring it produces many buds, about the size of capers, which are oblong, pointed, of a greenish yellow, and full of a clammy juice, which sticks to the fingers of those that touch them. It grows in moist watery places, on the sides of brooks and rivers; the buds appear in April, and the catkins in May or June. The buds are only made use of in medicine, and a tincture may be extracted from them with spirits of wine, which, according to Tournefort, is excellent to stop inveterate fluxes of the belly, and to heal internal ulcers. The dose is a drachm morning and evening, in a spoonful of hot broth. They are also employed in making the unguentum populeum.

POPULUS ALBA, *the white Poplar tree*, has a root that spreads on the surface of the earth, and the trunk is high, and full of branches, with a smooth, whitish bark. The wood is white, but not so hard as that of the black poplar, and is more easily cloven. The leaves are broad, and deeply cut on the edges, they being not very unlike those of the vine, or the large maple, but they are more small, green, smooth, and without hair above, but underneath they are white, and downy, and have long pedicles. The catkins and fruit grow on different trees, and are like those of the former. It delights in moist places, and grows to a considerable height in a little time. It may be easily propagated by the shoots that grow on the foot of the tree, and may be planted in meadows, but not in the places where the spreading roots will damage the grass. It grows almost every where, and the wood is of greater use than that of the black. In France they make wooden shoes with it, and it serves every where for the heels of women's shoes. No part of it is now used in medicine.

PORRUM COMMUNE CAPITATUM, *the common Leek*, has an oblong, almost cylindrical, smooth, shining, white, bulbous root, consisting of several white coats, joined one to another, and furnished below with several fibres. The leaves proceed from the coats of the root, to the height of a foot, and are pretty broad, and placed alternately; they are flat or folded in the form of a gutter, and are of a pale greenish colour. Between these leaves there rises a stalk to a considerable height, and in some countries it is five feet high, and as thick as a man's finger. It is firm, solid, full of juice, and has at the top a bunch of flowers, each of which consists of six petals, composed in the shape of a bell, with as many large cylindrical stamina, terminating in three capillaments, of which the middlemost is furnished with a chive. The pistil is seated in the center of the flower, which becomes a roundish fruit, divided into three cells, containing roundish seeds. It has somewhat of the smell of an onion, and is a common kitchen plant, used almost every where. It flowers in July, and its seed is ripe in August. It is

somewhat hard of digestion, and is a little windy; but these inconveniences may be avoided by boiling them well. They are diuretic, and a drachm of the seeds in particular may be given in a glass of white wine for that purpose. It is cultivated by sowing the seeds in the spring, along with those of onions; and when these last are drawn up in July, the leeks will have time to grow large afterwards.

PORTULACA, *Purslane*, has generally a single root with a few fibres, which becomes woody in length of time; the stalks grow to the height of a foot, and are thick, roundish, reddish, tender, full of juice, smooth, and divided into several branches; the leaves, which are ranged alternately, are almost round, thick, fleshy, shining, of a yellowish colour, and a clammy taste. The flowers grow at the places where the leaves join to the stalks, and are of a yellow or pale colour. They are each composed of five leaves, which expand in the form of a rose. The calyx consists of a single leaf, somewhat like a mitre, from which rises a pistil, which, together with the flower-cup, turns to a fruit, or oblong capsula, that is like a small urn, and of an herbaceous colour. These capsula open transversely into two parts, and contain many small black seeds. It is propagated almost every where in gardens, by seeds, which must be sown in beds of light rich earth, during any of the summer months, and it will be fit for use six months after sowing. It is cooling, abates the acrimony of the humours, and is excellent in the scurvy. It is only proper for young persons, and those of a hot, bilious constitution. The leaves of purslane being chewed, abate the pains of the teeth, that arise from having been set on edge by eating green fruit.

PRIMULA VERIS, *Primrose*, has a thick, scaly, reddish, fibrous root, that sends forth large, rough, wrinkled leaves in the spring of the year, which lie on the ground, and are covered with so short a down, that it can hardly be perceived. From among these leaves there arise several stalks, to the height of a palm, that are round, a little hairy, naked, firm, and sustain the bunches of flowers at the top; they consist of a single petal, the lower part of which is tubulous, but the upper part expands in the form of a salver, and is cut into several segments. The pistil arises from the flower-cup, which is fistulous, and, when the flower is decayed, turns to an oblong fruit or husk, lying almost concealed in the flower-cup; it opens on the top, and discovers many roundish seeds, fastened to the placenta. It grows almost every where in the fields, in shady places, from whence they may be transplanted into the garden, and placed under hedges. The best time for this is about Michaelmas, and then the roots will produce flowers early in the spring. It has always been observed, that this plant has somewhat of a soporiferous quality. The medicinal uses of this flower are not yet properly ascertained.

PRUNUS, *the Plumb tree*, has a flower that consists of five petals, placed in a circular order, and expanded in the form of a rose. The pistil arises from the flower-cup, which afterwards becomes an oval, globular fruit, with a soft fleshy pulp, surrounding an hard oblong stone, generally pointed. The pedicles, or foot stalks, are long and slender, and there is only a single plumb on each. There are several sorts of plumb trees, as the *Jean hantrve*, or white Primordian, which bears a small, longish, white plumb, of a clear yellow colour, covered over with a white flue, that easily wipes off. The juice is sweet, and it ripens in the middle of July.

The *early black Damask*, commonly called the *Morocco PLUMB*, is pretty large, of a round shape, and furrowed in the middle like a peach; the outside is of a dark black, covered with a light violet bloom; the flesh is yellow, and it parts readily from the stone.

It ripens towards the end of July, and is in good esteem.

The *little black damask PLUMB* is small and black, with a violet bloom, and the juice has a rich sweetish taste; the flesh parts readily from the stone; it is a good bearer, and is ripe towards the latter end of July.

The *great damask violet PLUMB* of *Tours* is pretty large, inclining to an oval shape, and the outside is of a dark blue, covered with a violet bloom; the juice is rich and sweet, the flesh yellow, and parts readily from the stone; it ripens towards the latter end of July.

The *Orleans PLUMB* is of a reddish black colour, and is a fruit so well known to almost every person, that it needs not be described; it is a very plentiful bearer, and is planted by those who supply the markets with fruit, though it is but an indifferent plumb.

The *Folkeſpringham PLUMB* is of a blackish red, is somewhat long, and deeply furrowed in the middle; it has a firm flesh, that readily parts from the stone; the juice is very rich, and it ripens towards the latter end of July.

The *Perdrigon PLUMB* is of a middle size, and an oval shape, with a very dark outside, covered over with a violet bloom. The flesh is firm, and full of an excellent rich juice; it is in great esteem, and is ripe in the beginning of August.

The *violet Perdrigon PLUMB* is a large fruit, and rather round than long; it is of a bluish colour on the outside, but the flesh is yellowish, pretty firm, and adheres closely to the stone; the juice is extremely rich, and it ripens in the beginning of August.

The *white Perdrigon PLUMB* is of a middle size, and an oblong shape, with a yellowish outside, covered with a white bloom. The flesh is firm and well tasted, and it is a very good fruit, either to eat raw, or make into a sweet-meat; for it has a pleasant sweetness, mixed with an acidity.

The *red imperial PLUMB* has a large fruit of an oval shape, and of a deep red colour, covered with a fine bloom. The flesh is very dry, but it makes excellent sweet-meats, and is ripe in the beginning of August.

The *white imperial Bonum magnum, or white Holland, or Mogul PLUMB*, is a large fruit, of an oval shape, and a yellowish colour, powdered over with a white bloom. The flesh is firm, and adheres close to the stone; the taste is acid or sour, which renders it unfit to be eaten raw; but it does very well baked, or to make sweet-meats thereof. It is ripe in the beginning of September.

The *Cheſſon PLUMB* is of a middle size, and of an oval shape, with a dark blue outside, and a violet bloom. The juice is rich, and it is ripe in the beginning of August.

The *Apricot PLUMB* is a large round fruit, of a yellow colour, powdered over with a white bloom; the flesh is dry, the taste sweet, and it parts readily from the stone. It ripens in the beginning of August.

The *Maitre Claud*, though it has a French name, is not so called in France; it is of a middle size, rather long than round, and the colour is finely variegated with red and yellow; the flesh is firm, has a delicate flavour, and parts readily from the stone; it is ripe in the beginning of August.

The *red diaper PLUMB* is a large round fruit, of a reddish colour, powdered over with a violet blue; the flesh has a very high flavour, and adheres closely to the stone, it is ripe about the middle of August.

St. Catherine's PLUMB is large and oval, but somewhat flat, and the outside is of an amber colour, powdered over with a whitish bloom; but the flesh is of a bright yellow, and is dry, firm, and adheres

closely to the stone. It has a very agreeable sweet taste, and makes an excellent sweet-meat; it is ripe in the beginning of September.

The *royal PLUMB* is a large fruit, of an oval shape, inclining to a point next the stalk; the colour is of a light red, powdered over with a whitish bloom, and the flesh, which has a fine sweet taste, adheres to the stone; it is ripe about the beginning of September.

The *Brignole PLUMB* is of a large oval shape, and of a yellowish colour, mixed with red; the flesh is of a bright yellow, and, though it is dry, has an excellent rich flavour. It ripens towards the latter end of August, and is thought to be the best plumb for sweet-meats yet known.

The *black Bullace* grows wild in the hedges all over England, and is seldom or never cultivated in gardens.

The *white Bullace* grows wild as the former, and is very rarely planted in gardens.

The *Black-thorn, or Sloe-tree*, is very common almost every where, and is chiefly used for planting hedges, like the white thorn, and its being of a quick growth renders it very proper for that purpose. All sorts of plumbs are propagated by budding or grafting on the stocks of any sort that shoot freely; however, budding is much preferable to grafting.

PLUMBS are in great esteem every where, and may be planted to grow in various manners, as in standards, espaliers, or against walls. They require a soil neither too dry nor too wet, and those that are planted against walls should be placed to an east or south-east aspect, which are better than a direct south. Plumbs in general are moistening, laxative, and emollient, except the bullaces and sloes, which are astringent. They are cooling, quench thirst, and create an appetite, and therefore they agree best with hot constitutions; but they do not at all sit easy with those that have weak stomachs. In those years that plumbs are very plenty, and consequently much eaten by all sorts of people, fluxes of the belly generally abound, which often turn to bloody fluxes; hence it appears, that they ought always to be eaten very moderately, and then they should be quite ripe and sound.

PULEGIUM, *Penny-royal*, has a creeping, fibrous root, with square hairy stalks, some of which are upright, and others creep upon the ground. The leaves are like those of marjoram, but softer to the touch, and blacker; the smell is agreeable, but strong, and the taste is hot. The flowers proceed from the places where the leaves join to the stalks, and are disposed in rings round them; they are of a bluish or purple colour, though sometimes of a pale red; they are labiated, and the upper lip is cut into two segments; these are succeeded by small seeds. It flowers in July and August, at which time it ought to be gathered for use. This plant is aperient, hysteric, and good for disorders of the stomach and breast. It is proper for inveterate coughs, and rheums, and some recommend it to cure whooping-coughs. It may be taken in the manner of tea.

PULMONARIA, *Lungwort, or Sage of Jerusalem*, has a white fibrous root, and angular, hairy stalks, which rise to a foot in height, and are of a purplish colour, resembling those of bugloss. Some of the leaves proceed from the root, and lie upon the ground, while others embrace the stalks without pedicles; they are all oblong, broad, terminate in a point, have a nerve that runs through the whole length, are covered with a soft down, and generally marbled with whitish spots. The flowers grow in bunches, and each consist of tubes, that terminate in the shape of balloons on the upper part; they are cut into five segments, and are of a purple or violet colour, with a calyx that is a dentated tube. They are

are succeeded by four roundish seeds, contained in the flower-cup like those of bugloss. It grows in woods, groves, and in mountainous and shady places. It is also cultivated in gardens, and flowers in March and April.

PULMONARIA ANGUSTIFOLIA, *Lungwort*, or *narrow leaved Sage of Bethlehem*, has a root like the former, which sends forth angular hairy stalks, to the height of a foot, and the leaves are oblong, narrow, and hairy, like those of wild bugloss, but softer, and not so rough; they have no pedicles, and they embrace their stalk by the middle. The flowers grow on the top of the stalks, and are like the former, only they are of a fine purple colour, mixed with blue. It grows almost every where, in woods and shady mountainous places.

PULMONARIA GALLORUM, *French Lungwort*, has a long, thick, jointed, reddish, fibrous root, full of a bitter milky juice, and the stalks rise to the height of a foot and a half; these are slender, hairy, and divided into several branches. The leaves proceed from the root, lie on the ground, and are sinuated towards the pedicle, they are greenish and hairy above, downy and whitish below; but generally marbled with long blackish spots. The flowers grow on the tops of the branches, and consist of yellow semi-florets, placed in a scaly cup; they are succeeded by oblong, small, tufted seeds, of a blackish colour. It generally grows on old walls, and in uncultivated places; it flowers in June and July, and sometimes later. They have all three the same virtues, and are accounted good in diseases of the lungs.

PULSATILLA, *Pasque-flower*, has a long, thickish, single root, which is divided into several heads, that are hairy on the upper part and black. The leaves proceed from the root, and are jagged and hairy; they are placed on long, reddish, very hairy ribs, that lie near the ground. From between the leaves there proceeds a round hollow stalk, to the height of a foot, covered with a thick soft down, and is without leaves, except one a little below the top. The flower consists of six oblong, pointed petals, disposed in the form of a rose, of a purple colour, hairy without, and smooth within. The pistil is placed in the middle, surrounded with yellow stamina or chives; this turns to a fruit, with a round head, that consists of several seeds, that terminate in a tuft like a feather. It grows in stony, dry, mountainous places, flowers near Easter, and is called Pasque by the French, from whence it has its name. It is cultivated in gardens, for the sake of the flowers. It is said to be a vulnerary plant, and the powder of the dried leaves and flowers, snuffed up the nose, provoke sneezing; but it leaves a burning heat behind it, that reaches as far as the brain; for this reason it is accounted good in sleepy diseases.

PYROLA, *Winter-green*, has a flexible, slender, fibrous, creeping, whitish root, which sends forth five or six fibrous leaves, like those of the pear tree; they are fleshy, thick, of a deep brownish green, and are smooth, have long pedicles lying on the ground, and continue green all the winter. The stalk rises to the height of a foot among the leaves, and is angular, single, and sometimes furnished with small pointed leaves; the flowers grow on the top, and are beautiful, scented, and are composed of five petals, placed in the form of a rose; they are white, and have ten shortish stamina, with a crooked pistil in the middle, like the trunk of an elephant; this turns to an angular fruit or button, consisting of five furrowed cells, containing reddish seeds, that are exceeding small. It grows wild in the north of England, on mossy moors, hills, and heaths; for which reason it is difficult to cultivate them in the southern parts; it flowers in June and July, and is looked upon to be an astringent vulnerary plant, and proper

to stop internal bleedings; it may be taken in the manner of tea.

PYRUS, *the Pear tree*, has flowers that consist of several leaves, placed in a circle, which expand in the form of a rose; the flower-cup becomes a fleshy fruit, universally known, that has a hollow like a navel on the upper part; the cells, in which the seeds are lodged, are separated by soft membranes. The tree is so well known, that it needs no description, and therefore it will be sufficient to describe the several sorts of fruit.

The *little musk* PEAR, commonly called *the supreme*, is generally produced in large clusters, and is rather round than long, with short stalks; the skin is yellow when ripe, and the juice is somewhat musty; it is an excellent pear, if gathered before it is too ripe. It ripens towards the middle of July, and will continue good but a few days.

The *Chio* PEAR, commonly called *the little Bastard musk pear*, is smaller than the former, but much of the same shape. The skin, when ripe, has a few streaks of red on the side next the sun, but it seldom hangs in clusters.

The *hasting* PEAR, commonly called *the green Chiffel*, is larger than either of the former, and is longer next the stalk. The skin is thin, and of a whitish green when ripe; the flesh melts in the mouth, and, if not too ripe, has a sweetish taste; it is fit to gather towards the end of July.

The *red* MUSCADELLE is a large early pear, of great beauty, and the skin is of a fine yellow, beautifully striped; the flesh has a rich taste, if gathered before it be too ripe; but it is apt to be mealy. The tree generally produces two crops in a year, the first of which is commonly ripe towards the end of July, and the second in September, but is seldom well tasted.

The *little* MUSCAT is a small pear, rather round than long, and the skin is very thin, and of a yellowish colour when ripe. The flesh melts in the mouth, and has a rich musky flavour; but will not keep long when ripe, which is towards the latter end of July.

The JARGONELLE is a very long pear, in the shape of a pyramid, with a long pedicle or stalk; the skin is pretty thick, and of a rusty colour towards the sun; but the other side is of a russet green; the flesh has a rich musky flavour, and it ripens towards the end of July. This is one of the best early summer pears.

The *Windsor* PEAR is of an oblong shape, and terminates almost in a point next the stalk; the skin is smooth, and when ripe, of a yellowish green, with a very soft flesh; but if it hangs two or three days after it is ripe, it grows mealy.

The JARGONELLE, now commonly called *Cuisse madame*, is somewhat like the *Windsor Pear*, but is longer towards the crown, and smaller next the stalk; the skin is smooth, and of a pale green, with a flesh that is apt to be mealy.

The *orange musk* PEAR is of a middle size, of a short roundish form, and a yellowish skin, spotted with black. The flesh is musky, but is apt to be a little dry and choaky; it is ripe in the beginning of August.

The *little blanket* PEAR is much less than the former, and more pinched in near the stalk, which is shorter, but slenderer than that of the former. The skin is soft, and of a pale green, with a tender flesh, full of a rich musky juice; it ripens in the beginning of August.

The *long stalked blanket* PEAR is shaped somewhat like the former, but the eye is larger, and more hollow at the crown; it is somewhat plumper towards the stalk, and a little crooked, with a very smooth white skin; the flesh is full of a rich sweetish juice, and it is ripe about the middle of August.

The

The *skinless* PEAR, or *early Russet*, is middle-sized, long, and of a reddish colour, with an extremely thin skin; the flesh melts in the mouth, and is full of a rich, sweet juice; it ripens in the beginning of August.

The *musk robine* PEAR, the *queen's* PEAR, or the *amber* PEAR, is small and round, and of a yellowish colour when ripe; the flesh has a rich musky flavour, and it ripens in the beginning of August.

The *musk drone* PEAR is middle sized and round, and the skin is of a yellowish colour when ripe. The flesh melts in the mouth, and is full of a musky juice; but, if it hangs too long on the tree, it grows mealy: it ripens in the beginning of August.

The *red orange* PEAR is middle sized and round, and of a greenish colour, except on the side next the sun, which is purple when ripe. The flesh melts in the mouth, and the juice is sweet, with a very hollow eye, and a short stalk; it ripens about the middle of August.

The *great onion*, PEAR, or the *Summer Arch-duke*, is of a middle size and round, and of a brownish purple next the sun; the flesh melts in the mouth, and is tolerable good; it ripens in the beginning of August.

The *August MUSCAT*, or the *royal* PEAR, is in shape much like a Bergamot, and the stalk is long, strait, and a little spotted. The skin is smooth, and of a whitish yellow colour, with a rich, sweet, perfumed juice; it is one of the best summer pears yet known, and grows ripe in August.

The *rose* PEAR is short and round, and of a yellowish green colour, but a little inclining to red next the sun. The stalk is very long and slender, and the juice is musky; it grows ripe in August.

The *prince's* PEAR is small, roundish, and of a bright red colour next the sun, but on the other side it is yellowish; the flesh has a very high flavour, and grows ripe in the middle of September.

The *great mouth-water* PEAR is large and round, with a smooth green skin, and a short thick stalk; the flesh melts in the mouth, and is full of juice, if gathered before it is too ripe, which is about the middle of August.

The *summer Bergamot* is a pretty large, round, flat pear, of a greenish yellow colour, and hollowed a little at both ends, like an apple; the flesh melts in the mouth, and it is ripe towards the latter end of August.

The *autumnal Bergamot* is smaller than the former, but of the same shape, with a yellowish green skin, reddish on the side next the sun; the flesh melts in the mouth, and it grows ripe towards the latter end of September.

The *Swiss Bergamot* is somewhat rounder than the former, with a tough greenish skin striped with red; the flesh is full of juice, melts in the mouth, and it is ripe in the beginning of October.

The *red butter* PEAR is sometimes of other colours, as green or grey, whence some have supposed them to be different fruits. It is large and long, and generally brown, with a melting flesh, full of rich sweet juice; it ripens in the beginning of October.

The *long green* PEAR is long, and very green when ripe, with a melting juicy flesh. It grows ripe in the middle of October, and in some years will keep till December.

The *white and grey Messicure Jean* is one of the best autumnal pears, when grafted on a free stock. It is a large roundish fruit, with a tough skin, that is generally brown; it is full of a rich sweet juice, and ripens about the beginning of October.

The *flowered Muscat* is an excellent pear, of a middle size, and round, with a dark red skin; the flesh is very tender, and of a delicate flavour; it ripens towards the end of October.

The *vine* PEAR is round, and of a middle size, with a dark red skin; the flesh is full of a clammy juice, and it grows ripe towards the end of October; but should be gathered before, otherwise it will soon rot.

The *Roussiline* PEAR has a smooth skin, of a deep red colour next the sun, with grey spots, but the other side is of a greenish-yellow; the flesh is tender and delicate, and the juice sweet; it is ripe towards the end of October, but must not be kept long.

The *Marquise* PEAR is like the Blaker, when planted in a dry soil; but, when it is rich and moist, it grows larger. It is flat at the top, with a small hollow eye, and a skin of a greenish yellow, inclining to red on the side next the sun. If it is yellow when ripe, the flesh is tender and delicate, and full of a sweet juice. It grows ripe at the beginning of November.

The *crassane*, or *flat butter* PEAR, is of a middle size, and hollowed at the crown like an apple. The stalk is very long and crooked, and the skin is rough, and of a greenish colour when ripe, or rather russet. The flesh is tender and buttery, with a rich sweet juice. It is the very best pear of the season, and is fit to eat about the middle of November.

The *Lansac*, or *Dauphine* PEAR, is about the size of a Bergamot, of a roundish shape, and flat towards the head; but it is a little longish towards the stalk; the skin is smooth, of a yellowish-green, with a yellow, tender, sweet flesh; the eye is very large, and the stalk long and strait; it grows ripe about the middle of November.

The *Martinsec* is like the russet in shape and colour. The shape is oblong, and the skin is of a deep russet on one side, but on the other inclining to red. The flesh is fine and sweet, and it is fit to eat about the latter end of November.

The *little lard* PEAR, or the *russet of Anjou*, is of a bright green, with a few spots, and a large hollow eye. The flesh is extremely fine, with a sweet juice; it is fit to eat in December, and is one of the best fruits in that season.

The *Louise home* has a short fleshy stalk, a small eye and flower, and a very smooth skin; the colour is green, inclining to white, and the flesh is extremely tender, and full of a sweet juice. It is fit to eat in December.

The *Eschafforie*, or the *winter long green* PEAR, is shaped like a citron, with a smooth green skin, that becomes yellowish when ripe. The eye is small, and the flesh melting and buttery, with a sweet juice. It is fit to eat in the beginning of December.

Parkinson's Warden, or the *black Pear of Worcester*, commonly weighs a pound or upwards, and has a rough, dark, red skin next the sun. It is only fit for baking or stewing, and is in season from November to Christmas.

The *small winter butter* PEAR has a small oblong shape, and a yellow colour, spotted with red. The flesh has a very rich juice, and it is fit to eat in December and January.

The *Ronville* PEAR is about the size and shape of a large russet, and the middle is swelled more on one side than the other; the skin is soft and smooth, and of a lively red colour next the sun, but yellow on the other; the flesh is full of a very sweet juice, that is a little perfumed.

The *winter citron* PEAR, or the *Musk-orange*, is a pretty large pear, and is in shape and colour very like an orange; the flesh is hard and dry, and apt to be stony, but it bakes very well, and is in season from December to March.

The *winter russet* PEAR is of a greenish-yellow, inclining to brown, with a buttery melting flesh, which is generally very full of a very sweet juice; but

but it must always be pared, because the skin has a bad taste. It is fit to eat in January and February.

The *Bergamot Bugi* is a large pear, and almost round, but it is a little longish towards the stalk; the eye is flat, and the skin green, and there are many rough protuberances thereon; but as it ripens it becomes yellowish, and in a good season the flesh is sweet; it is good to eat from February to April.

The *Dutch Bergamont* is large and round, and of the shape of the common bergamot; the colour is greenish, the flesh pretty tender, and the juice of a high flavour. It continues good till April.

The *Naples PEAR* is pretty large, long, and greenish, with a sweet, and somewhat veinous juice; it is called in England the *Easter St. Germain*, and will keep till April.

There are many other sorts of pears that are still to be seen in some old gardens, but are of no great esteem; those that plant pears for use, ought always to choose them of the best sorts, because the trouble and expence is the same. They are propagated by budding or grafting them upon stocks of their own kind, which are commonly called free stocks; but quince stocks are greatly used in the nurseries, for all sorts of pears that are designed for dwarfs or walls.

As to wild pears, they are always so astringent and rough, that they are not fit to be eaten, though they may serve well enough to make perry. In general, pears are windy, and improper for weak stomachs; some think they are enemies to the nervous parts; however, those are best that are quite ripe, and have a sweet juice, and then they are seldom noxious, unless eaten to excess.

QUERCUS VULGARIS, *the common oak tree*, is well known in all parts of Europe, as also its wood, for its long duration, and various uses. The flowers are long catkins, which consist of a great number of small slender threads; but the embryos are produced at some distance from these, and afterwards become acorns, with hard scaly cups. It grows in woods, forests, and high mountainous places; the leaves appear before the flower, and the catkins may be seen in April and May, but the acorns are not ripe till August. It is commonly said, that an oak tree is an hundred years coming to its full growth, an hundred years in perfection, and an hundred years in decaying. Some affirm the wood will continue good six hundred years in the open air, and five hundred under ground. Oak bark is of very great use for tanning of leather, and upon these accounts the oak is called by some the king of trees. The English oak is best for building of ships; but now there are great numbers constructed in New-England, of the oak wood that grows in those parts, though they are not so lasting.

The leaves of the oak are styptick, and a little bitterish, and all parts of it are astringent. They have often been prescribed for all sorts of hæmorrhages and fluxes of the belly, and some pretend that a decoction of the bark has cured a most terrible bloody-flux. In times of scarcity, a great many poor people have made bread of the acorns, and the poets tell us they were the food of the golden age; however, they are heavy, windy, and hard of digestion, and therefore mankind in those early ages must doubtless have a better digestion than us. They are now given to hogs, for which they are excellent nourishment, and render the flesh fat, firm, and sweet; for which reason that bacon is in most esteem, that comes from places where there are plenty of acorns.

There are a great number of trees that go under the name of oaks, in divers parts of the world, but there are no where so many different kinds, as in America; the wood however is not nigh so valuable as the English oak, which has been hinted at above.

QUINQUE FOLIUM, *Cinquefoil*, has a long fibrous root, blackish without, and reddish within, which sends forth several stalks to the height of a foot and a half, which are round, flexible, hairy, reddish, and knotted; from these knots the leaves and roots proceed, and by their means this plant multiplies greatly. The leaves are oblong, roundish at the ends, nervous, hairy, dentated on the edges, of a dark green, and placed like an open hand, to the number of five upon the same pedicle, which is three inches and upwards in length. The flowers grow single on the top of the stalks, and consist of five yellow petals, in the form of a rose, and are somewhat in the shape of a heart; there are five stamina, with their apices in the form of a half-moon, and the pistil becomes a round fruit, composed of many pointed seeds, placed in the form of a head, and contained in the cup of the flower. It grows in fields, and in sandy stony places, as well as in meadows on the sides of waters; it flowers in May and June, and the root is chiefly in use. It is accounted balsamic, vulnerary, and astringent, and has been given in all sorts of hæmorrhages, as well as in all kinds of fluxes of the belly; some affirm it succeeds better than ipecacuanha; for which purpose an ounce of the root has been boiled in three pints of water to two; this decoction is also recommended in spitting of blood. It is confidently said, that a drachm of this root, given in a glass of water, before a fit of an ague, will certainly cure it.

RANUNCULUS BULBOSUS, *Bulbous Crow-foot*, has a round bulbous root, with several upright stalks, that sometimes rise to the height of a foot, which are hairy, and have leaves that are cut into several slender jags, and on the top there are flowers of a fine yellow shining colour; they are generally single, and consist of five roundish petals, disposed in the form of a rose, the leaves of the calyx being bent back towards the pedicle. The fruit that succeeds the flower contains many roundish seeds, placed together in the form of a head. It flowers in May, and is to be met with almost every where in pasture grounds and meadows. When it is transplanted into gardens, the flower becomes double. The root of crow-foot is extremely acrid and caustic, and some authors recommend it to raise blisters; but this practice is dangerous, because it may cause a gangrene. There are quacks that apply it to the part afflicted with the gout, and on corns, to take them away; but we have much safer remedies. In some places it is common for beggars to make sores with this root, to raise compassion. The bruised leaves were once applied to the head of a patient, who had kept his bed for three years, on account of a violent head-ach, and they raised a blister, which ran freely, and he was soon cured.

RANUNCULUS NEMOROSUS, *Wood Anemone*, has a long creeping root, purplish or brown without, and yellowish within, when young. The stalk is small, slender, reddish, and rises to the height of a palm and a half, on the top of which there are three leaves, or reddish pedicles, each of which are cut down to the pedicle into three jags, and on the top there is a single flower without a calyx, sometimes white, and sometimes purplish or flesh coloured; it consists of six oblong leaves, in the middle of which there are several yellowish stamina. These are succeeded by naked, oblong, hairy seeds, collected into a head. It flowers towards the beginning of March, to the end of April. Some recommend a cataplasm of the leaves and flowers for scald heads, and affirm it will cure them in a few days, if it be renewed twice a day; but others think it unsafe, from the bad effects they have seen from such applications.

RANUNCULUS PRATENSIS REPENS, *Crow-foot*, has a small creeping root, composed of whitish fibres, and many slender, round, hairy, hollow, creeping

creeping stalks, that lie upon the ground. The leaves are cut into three segments, somewhat like parsley, and are dentated on the edges, and hairy on both sides; they are of a blackish green, and generally marked with fine spots on the upper part. The flowers are of a shining yellow, and composed of five petals, disposed in the form of a rose, with a great number of stamina in the middle, and a flower-cup, consisting of five leaves, that falls off with the flower, which are succeeded by black seeds, placed together in the form of a head, and full of small points or prickles. It flowers in May, and grows almost every where in meadows and shady places. This may be taken inwardly without danger, and the cattle that feed on it yield a great deal of milk. Some use it in a fomentation against the piles. There are other species of the crow-foot, which had best be avoided.

RAPA, the Turnep plant, has a tuberosc, fleshy, bellied, round, thick root, that grows sometimes to the size of a child's head, and is universally known. The leaves are oblong, large, lie upon the ground, and are cut deeply into jags. They are rough to the touch, are of a greenish brown colour, and of the taste of a pot herb. The stalk rises from among the leaves, to the height of two feet, and sometimes to that of a man. The leaves embrace the stalk with their broad base, and terminate in a point. The flowers grow on the top of the stalk, are yellow, and consist of four leaves, disposed in the form of a cross, with a calyx fixed on a long slender pedicle. The pistil is succeeded by a pod, divided into two cells, by a partition, which contain two rows of roundish, reddish seeds. It flowers in the spring and summer.

RAPA OBLONGA, five **FEMINA**, oblong, or female Turnep, differs from the former in having an oblong root that is not so thick. Besides these, there are the garden turnep, with a green root above ground; the ground garden turnep with a purple root; the round garden turnep with a rusty black root, and the round garden turnep with a yellow root both within and without; they all delight in a light sandy soil, for in a rich soil they will grow rank and sticky. The common season for sowing them is from the middle of June to the latter end of August, and in some places they sow them much later.

The use of turneps, as an aliment, is well known, and they are accounted an emollient, and proper to abate the acrimony of the humours; but they are windy, cause obstructions, and do not digest very easily. They are accounted a great pectoral, and many have been said to be cured of an asthma by their juice, that is, by taking a large spoonful in a morning fasting, for forty days together.

RAPHANUS MINOR, the garden Radish, has a long fleshy root, red or purple without, and white within. The leaves are large, rough, green, deeply cut, and much like those of turneps. A stalk arises from among these, to the height of a foot and a half, or two feet, that is round, branched, and is adorned with flowers, consisting of four petals, in the form of a cross; the pistil arises from the flower-cup, which turns into a pod of the shape of a horn, that is spongy within, and contains two rows of roundish seeds that are separated by a thin membrane. It is cultivated in gardens, and the root is chiefly in use in the spring, which is tender, full of juice, and eaten as food. It agrees very well with most constitutions, provided they have good stomachs, for it is apt to rise therein. The juice is good in the gravel, if four ounces be taken of it for four days, in a morning fasting.

RAPHANUS RUSTICANUS, Horse Radish, has a long, thick, creeping, white root, that sends forth large long pointed leaves, of a fine green colour,

somewhat like monk's rhubarb. From among these there arises a stalk, to the height of a foot and a half, which is upright, hollow, furrowed, and furnished with leaves, a palm in length, and an inch in breadth, and cut deeply on both sides. On the top there are small flowers, composed of four white petals, in the form of a cross, which are succeeded by small roundish pods, divided into two cells, that contain smooth, roundish, reddish seeds. It flowers in the spring, and grows wild on the sides of brooks and rivers, but is cultivated in gardens. It is used as mustard, to promote the digestion of aliments, and to create an appetite. The distilled water is given to four ounces against the scurvy and gravel, and to cleanse the blood. The expressed juice of the roots and seeds mixed with honey, and taken in a morning fasting, for some time, in whey, cleanses the stomach, kidneys, and lungs; it cures coughs, and inveterate hoarsenesses, provided they are not dry, or attended with spitting of blood. It is said to be excellent against the scurvy, dropsy, and rheumatism, if continued for some time. The dose of the root in powder, is from one scruple to two; of the fresh root in decoction, from half an ounce to an ounce; and of the juice a spoonful. It is hard to say what a scruple of the root will do, since it is often eaten at meals in much larger quantities, therefore this seems to be a trifling dose.

RESEDA VULGARIS, common bastard Rocket, has a long, slender, woody, white root, which sends forth several stalks, to the height of a foot and a half, that are furrowed, hollow, hairy, branched, weak, crooked, and furnished with leaves, placed alternately; these are deeply cut, are curled, and of a dark green colour, with the taste of a pot-herb. The flowers are in loose spikes, and are each composed of yellow irregular petals, in the middle of which there are several small stamina, with yellow apices, and a pistil that turns to a four-cornered fruit, an inch in length, and like cylindric urns, full of small, roundish, black seeds. It flowers in June, July, and August, and is common in the fields. There are several kinds of this plant, that are propagated in the gardens of curious botanists. It is said to be emollient and resolvent, and is applied externally by some, to discuss inflammatory swellings, as well as to ease the pain.

RHAMNUS CATHARTICUS, purging Buckthorn, is a shrub with a long, hard, woody root, and it sometimes grows to the height of a tree, with a bark, like that of the cherry tree, and a yellowish wood; the branches are armed with thorns, like those of the wild pear tree. The leaves are roundish, of a blackish green, slightly dentated on the edges, and pretty much like those of the plumb tree. The flowers are small, of a greenish or yellowish colour, grow in bunches along the branches, and consist of single petals, in the shape of a funnel, divided at the top into four parts, and have as many stamina. These are succeeded by soft berries, green at first, and black when they are ripe; they are as large as juniper berries, are shining, and full of a greenish black juice, with four seeds, roundish on the back. This shrub is common in hedges, and flowers in May, and the berries are ripe towards October. When these berries are gathered in harvest time, and steeped in alum-water, they will yield a yellow or saffron coloured juice; if they are gathered in autumn, when they are ripe, and kept in a glass vessel, they will yield a good green; but if they are left on the tree till towards St. Martin's day, they will yield a scarlet, that is very useful to dye leather, and to colour cards with red. It is well known that the berries are a purge, which are said to be good in the dropsy, palsy, rheumatism, and gout. A drachm, or a drachm and a half, of the ripe berries, dried and powdered, is a dose. They generally occasion gripes,

gripes, sickness, a dryness of the mouth and throat, and thirst. About twenty of the fresh berries is a dose in substance, and twice or thrice this number in decoction, or an ounce of the expressed juice. A syrup made of the juice is kept in the shops.

RHUS FOLIO ULMI, *common Sumach*, has a long, creeping, woody root, and is a shrub that grows sometimes to the height of a tree; the leaves are oblong, pointed, hairy, winged, reddish, dentated on the edges. The flowers grow in bunches among the leaves of the branches, at the top, and are of a whitish yellow colour; they are composed of five leaves disposed in the form of a rose, sustained by a calyx, and divided into five parts. The pistil turns to a flat, oval, membranous, greenish capsula, that contains a single seed, almost of the shape of a kidney. It grows plentifully in the southern parts of Europe, as also in Turkey, where the branches are used for tanning of leather. This is not so common in England, as those brought from America, which are the *Virginian Sumach*, improperly called *the Stag's horn tree*; *New England Sumach*, with loose herbaceous particles, and smooth branches, the *Canada Sumach*, with a longer leaf, smooth on each side, and the *dwarf Virginian Sumach* with narrow leaves. The first of these is very common in gardens, and produces bunches of small flowers in June, at the extremities of the branches, which are succeeded by seed included in red covers. They may be all propagated by seeds, which should be sown soon after they are ripe, and the plants will come up the following spring. The leaves and fruit have been sometimes used in decoctions, for fluxes of the belly, and against internal hæmorrhages.

RIBES VULGARIS, *the red Currant bush*, rises to the height of two or three cubits, and has a bay or ash coloured bark. The leaves are like those of the vine, but much less, and are smooth, of a dark green above, but covered with a soft down beneath. The flowers grow in bunches, and are composed of five purple petals, placed in the form of a rose, and are somewhat in the shape of a heart. The calyx is in the form of a basin, divided into five segments, and the hinder part turns to a berry, green at first, and afterwards red, which is universally known. Besides this, there are other sorts, as *the Dutch red Currant*, *the common white*, *the large Dutch white*, *the Champaign*, *the Gooseberry leaved*, *the small wild*, *the black*, and *the yellow striped leaved*; *the common Currant*, with leaves, beautifully variegated with green and white; *the white Currant with striped leaves*; *the striped gooseberry leaved Currant*; *the black Currant with striped leaves*; and *the American black Currant*. The manner of the flowering of this last is very different from the other sorts; but the fruit is not much valued. They may be all propagated by cuttings, from September to March, but autumn is best, and they will thrive almost in any soil or situation. Red currants, and their preparations, are generally accounted good to abate internal heats, and to restrain the effervescence of the blood; as they are somewhat astringent, they strengthen the stomach, excite an appetite, and are good against vomiting. Currants eaten too freely will cause loosenesses, attended with gripes, and are hurtful to the lungs.

The leaves of black CURRANTS have been accounted by some a sort of a panacea, and in some parts of France, after they have been bruised in wine, and the juice pressed out, it has been given to half a pint, twice a day, for eight days together, to those that have been bitten by a mad dog, that is, in the morning fasting, and three or four hours after dinner. Others say, that four ounces of the juice of the leaves, or rather the infusion in wine, for twenty-four hours, given to four ounces in a morning fasting, will cure the dropsy. In the Philosophical Transactions it is said, that the gelly of black cur-

rants, swallowed down leisurely in small quantities, is a specific against the quinsy; and in winter, when the gelly cannot be had, a decoction of the leaves and bark in milk, used as a gargle, is said to cure all inflammatory distempers of the throat.

ROSA PALLIDA, *five INCARNATA*, *the pale Rose*, has a long, hard, woody root, that sends forth several stalks, which form a shrub, that divides into firm long branches, covered with a dark greenish bark, and often furnished with strong prickles; the leaves grow by pairs, and are generally seven in number, on one rib, which is terminated by a single leaf; these are roundish, dentated on the edges, and rough to the touch. The flower is sometimes single, and composed of five large petals or leaves, with several yellow apices in the middle. It is sometimes double, and then the external petals are a little larger than the internal, and of an agreeable red or carnation colour, with a very sweet, though weak smell. When the flower is falling off, the calyx turns to an oval fruit, in the shape of a small olive, with a rind that is a little fleshy, and consists only of a single cell, full of angular, hairy, whitish seeds. It flowers in May and June, and is cultivated in gardens. The distilled water from these roses is accounted good against inflammations of the eyes; and some say when it is given inwardly, from one ounce to six, it will stop loosenesses and spitting of blood; but the syrup of pale roses is solutive, and is given from an ounce and a half to two ounces.

ROSA DAMASCENA PALLIDA, *the damask Rose*, has a root like the former, from whence arise stalks or stems, to the height of ten or twelve feet, which are thick, strait, and armed with reddish strong thorns, that are not so flat as those of the former; the leaves are also set at greater distances, are less wrinkled, more pointed, and are green above, and whitish below; they are dentated on the edges, and are sometimes seven, and sometimes nine on the same rib, placed by pairs opposite to each other, and terminating in a single leaf; it has crooked thorns on the base. Some of these rose bushes have flowers, consisting only of five petals, that have a very sweet smell. It is cultivated in gardens, and flowers in autumn. That with double flowers is not of a distinct kind, but only a variation of the former. The flowers are solutive, or rather purging; for two pugils infused in veal broth, and taken in a morning, will purge very well.

ROSA ALBA, *the white Rose*, has a root like the former, which sends forth stalks to the height of eight or ten feet, which are thick, woody, and armed with crooked pedicles. There are sometimes five, and sometimes seven, oblong, smooth, crenated leaves on one rib, that are sometimes prickly at the base. The flowers which grow at the extremity of the branches are large, beautiful, and have a sweet smell. It is cultivated in gardens, and generally flowers in May and June. All authors agree, that they are astringent, and the distilled water is made use of, in some parts, against inflammations of the eyes.

ROSA RUBRA, *the red Rose*, has a creeping, strong, woody root, with several stems, that are lower than those of the former, covered with a green bark, armed with prickles. The flowers are of a beautiful red, with a sweet agreeable smell; it is cultivated in gardens, where it flowers in June and July. These are reckoned astringent, cleansing, and proper to strengthen the stomach, to stop vomiting, fluxes, and hæmorrhages. The dose of the conserve is from two drachms to half an ounce, and is given against coughs, and in consumptions.

ROSA SYLVESTRIS VULGARIS, *the Dog-Rose*, has a long, creeping, hard, woody root, that sends forth long thick branches, armed with strong thorns or prickles; the leaves are large, oblong, smooth,

smooth, and like those of the common rose. The flowers consist of five white petals, with a mixture of red or carnation, and they fall off with the least blast of wind; they are succeeded by oval oblong fruit, which are green at the beginning, and as red as coral when they are ripe. The rind is fleshy, and has a sweetish tart taste; the seeds are angular, white, hard, and wrapped up in strong hair, that readily separates from them. It grows every where near or in hedges without cultivation. The fruit is called hips, and there is a conserve made of them kept in the shops. These flowers are purgative, like those of other roses; but the conserve is recommended in fluxes of the belly, to moderate the heat of the bile, and to abate the sharpness of urine; the dose is from two drachms to half an ounce.

ROSMARINUS HORTENSIS ANGUSTIORE FOLIO, *narrow leaved garden Rosemary*, has a slender, small, fibrous root, that sends forth a stalk that becomes a shrub, which in some countries rises to the height of three or four feet; the leaves are whole, narrow, hard, stiff, of a brownish green above, and white below. The flower consists of a single petal, of a pale blue colour, that is labiated, and whose upper lip, or crest, is cut into two parts, and is turned backwards, with crooked stamina or chives; but the upper lip or beard is divided into three parts, the middlemost of which is hollow like a spoon; the flower cup is dentated, being divided into three cells, from whence arises the pistil, attended with four embryos, that turn to as many roundish seeds, inclosed in the flower cup. It is cultivated in gardens, and flowers in April, May, and June; but it grows wild in many hot countries, such as Spain, Italy, and the southern parts of France. However, they are hardy enough to bear a moderate winter in these parts in the open air, provided they are planted on a poor, dry, gravelly soil. Besides this, there is the *broad leaved garden Rosemary*; the *gold striped Rosemary*; the *narrow leaved silver striped Rosemary*; the *Rosemary of Almeria*, with a large spiked purplish flower, and the *broad leaved Rosemary with an elegant striped leaf*. They may be all propagated by planting slips or cuttings at the beginning of the year, upon a bed of light fresh earth, and they should be transplanted in the beginning of September, to the places where they are designed to grow.

The flowers and leaves are made use of in medicine, and are used both internally and externally. They strengthen the brain, are good against the palsy and epilepsy, as well as obstructions of the viscera, they restore the tone of the solids, and incide and attenuate gross humours. The water wherein the flowers and leaves are steeped for a night, is good for the jaundice, and it strengthens the memory and sight. Hungary-water is made from the flowers, cups, and young leaves of this plant, after they have been digested in spirits of wine, and the spirit distilled off; the dose of this is a small spoonful, in a glass of water. The conserve of the flowers is cordial, stomachic, and cephalic, and the dose is from a drachm to half an ounce. Boerhaave looks upon the essential oil, to be the best remedy against the epilepsy; and a few drops of it are to be given in wine; the usual dose of this is five or six drops.

ROS SOLIS, *Sun dew*, has a fibrous, slender, hairy root, that sends forth several long, small, hairy branches, on which there are small roundish leaves that are hollow like an ear-picker, and of a pale green; the stalks are adorned with a reddish, hairy fringe, and are hollow, from whence transudes drops of a fluid into the hollow of the leaves, inso-much that their hair is always moist, as it were with dew, in the driest seasons. From among the leaves there arise two or three stalks, to the height of six inches, that are slender, round, reddish,

tender, without leaves, and on whose top are small whitish flowers, with several petals placed in the form of a rose. The flower cup is in the shape of a dentated horn, and the flowers themselves hang on one side. They are succeeded by small fruit, of the size of a grain of wheat, which contains several seeds. It grows in deserts, wild, sandy, moist, marshy places, and most commonly among water moss, of a whitish red colour, and flowers in June and July. This plant is said to be pectoral, and good against all disorders of the lungs; the dose is a drachm in powder, and two drachms in infusion. Boerhaave recommends this last in the vertigo, the epilepsy, and disorders of the eyes.

RUBIA TINCTORUM SATIVA, *cultivated dyer's Madder*, has a long, creeping, succulent root, divided into several branches, and of the thickness of a goose-quill. It is woody, and red both without and within. It sends forth long branches, that are square, geniculated, or knotty, and rough; and from each knot there proceed five or six oblong leaves, that surround the stalk in the form of a star; they are hairy, and crenated all round, with small furrows. The flowers grow on the tops of the branches, and consist of a single leaf, which is cut into four or five segments, expanded at the top; the flower cup becomes a fruit, composed of two juicy berries closely joined together, which are black when ripe, and full of juice; each contains a seed, which is generally hollowed like a navel, and is almost round. It flowers in July and August, is cultivated in many parts of Europe, and is made use of for dying. Though the propagation of it in England has been long neglected, it is now cultivated with greater spirit than ever, by which we are supposed to save near thirty thousand pounds annually. The root is taken out of the earth in May and June, and they dry it for transportation. The root is one of the five lesser opening roots, and is said to resolve gross humours, and to be useful in obstructions of the viscera. Boerhaave affirms, it is good against the gravel, and cleanses the kidneys and bladder from mucous matter. The dose of the root in powder is a drachm or two, and in decoction from half an ounce to an ounce. It has one very uncommon property, that is, it will turn the bones of those animals red, that have fed upon it for some time.

RUBUS VULGARIS FRUCTU NIGRO, *the common Bramble or Blackberry bush*, has a slender, creeping, knotty root, that sends forth several long, weak, bending, greenish, red, angular, pithy branches, that are armed with strong crooked prickles, which lay hold of the garments of those that pass by. The leaves are oblong, pointed, dentated on the edges, rough, and brown above, but whitish below; they are placed by three's, or five's, on the same pedicles, and never fall off in winter, till others come in their places. The flowers on the end of the branches consist of five petals or reddish leaves, disposed in the form of a rose, and the flower cup is cut into five parts, in the middle of which there is a pistil, surrounded with a great number of stamina, or chives. These are succeeded by round or oval fruit, nearly like mulberries, that are composed of several berries, full of juice, closely joined together, that are red at first, and black when ripe; each of these contain an oblong seed. It grows almost every where in the fields and woods, and flowers in June, July, and August: the fruit is ripe in autumn. The root is cleansing, astringent, and absorbent; and a syrup made of the fruit is recommended in heat of urine. Boerhaave affirms, that the roots taken out of the earth in February or March, and boiled with honey, are an excellent remedy against the dropsy. The leaves pounded and applied to ring-worms and ulcers of the legs, heal them in a short

time. The fruit when ripe is cooling, and quenches thirst.

RUBUS IDÆUS SPINOSUS FRUCTU RUBRO ET ALBO, the *Raspberry bush*, has a long creeping root, divided into several branches, and sends forth several stalks, to the height of a man, armed with thorns, that are not very prickly; the leaves are like those of the bramble, but more tender and soft, and of a brownish green above, but whitish below. The flowers are white, and consist of five petals, disposed in the form of a rose, and the calyx is divided into five parts; from the center of which the pistil arises, with many stamina, that afterwards turn to the fruit, which is larger than a strawberry. It is round, a little hairy, and composed of five berries, joined closely together; the colour is generally red, and they are full of a rich vinous juice, and each contain a seed. It grows wild in moist shady woods, and is cultivated in gardens and orchards; it flowers in May and June, and the root is ripe in July, but it will not keep. There are other sorts of raspberries, and particularly one, that has white fruit; but they have all the same qualities, and are said to be cooling, cordial, and to strengthen the stomach. They agree with people of hot constitutions, and there is a syrup made with them, that is kept in the shops.

RUSCUS LATIFOLIUS FRUCTU FOLIO IN NASCENTE, *narrow leaved butcher's broom*, or *Alexandrian laurel*, with the fruit growing on the leaves, has a long, white, hard, knotty, fibrous root, that sends forth stalks to the height of two feet, which are small, flexible, green, round, and furnished with pretty thick, broad, nervous, bending leaves, of a beautiful green, and resembling those of the common bay tree. The flowers proceed from the large nerve of the leaves, and are in the shape of little bells, but without pedicles; they are small, and of a greenish or pale yellow, with a pistil in the middle, that becomes a soft roundish fruit or berry, that is red when ripe, and contains two seeds as hard as horn. This shrub grows wild in mountainous places, and is cultivated in gardens. It flowers in summer, and the fruit is ripe in autumn. The roots are said to be aperient, and to be good in a suppression of urine; the leaves are vulnerary, and proper to cleanse and dry moist ulcers.

RUSCUS MYRTIFOLIUS ACULCATUS, the *common Knee-bolley*, or *butcher's broom*, has a thick, crooked, warty, hard, creeping, white root, furnished with thick long fibres, and sends forth stalks to the height of two feet, that are tough and hard to break; and are furrowed, and divided into several branches. The leaves are like those of the myrtle, but more stiff and rough, pointed, prickly, nervous, and without pedicles; they are always green, and have a bitter astringent taste. The flowers grow in the middle of the leaf, and consist of a single petal, cut into six parts, whose stamina, being united, are in the shape of a bell, but there is no calyx. These are succeeded by round berries, as large as peas, somewhat soft and red when ripe. It grows in rough, stony places, and in woods, forests, and hedges; it flowers in April and May. There proceed tender shoots from the roots in spring, that are green, and may be eaten as asparagus. If they are suffered to grow, they become leafy, woody, and tough; and in some places they make brooms with them. This plant is said to incise gross humours, and to carry them off by urine; and the root is one of the five greater opening roots. The dose is from half an ounce to an ounce in decoction, and has been recommended in the jaundice, dropsy, and gravel. Boerhaave affirms, that the decoction of the leaves, in white wine, is an excellent remedy in the gravel and dropsy, and the dose is a glass in a morning fasting; but it must be continued for some time.

RUTA HORTENSIS LATIFOLIA, the *common broad leaved garden Rue*, has a woody root, furnished with a great number of fibres, and sends forth stalks in the form of a shrub, that sometimes rise to the height of five or six feet; they are as thick as one's finger, woody, divided into several branches, and covered with a whitish bark. The leaves are divided into several segments, and are small, oblong, smooth, of a sea-green colour, and placed by pairs in a rib, terminating in a single leaf. The flowers grow on the tops of the branches, and generally consist of four somewhat oval leaves, of a pale yellow; the pistil arises out of the flower cup, which turns to a fruit, consisting of four capsulæ, fixed to an axis, that are full of angular seeds, in the form of a kidney. It is cultivated every where in gardens, flowers in June, and continues green all the winter.

RUTA SYLVESTRIS MAJOR, the *greater wild Rue*, is somewhat like the garden rue, but smaller, and the leaves are divided into longer segments, which are also more narrow, and of a darker green. It grows in the southern parts of Europe, in rough, stoney, mountainous places. They both have the same virtues, and have a disagreeable smell, with an acrid bitter taste. The leaves, when in perfection, will blister the skin, if much handled, and are said to be incising, attenuant, and discussive; therefore they are proper, as they have also a stimulating quality, to quicken the circulation of the fluids, to dissolve gross humours, and to open obstructions of the glands. Boerhaave had a high opinion of it, and affirms nothing can be more proper to promote sweat and perspiration, and to cure the hysteric passion, and the epilepsy. An extract, made with the rectified spirit, contains the whole virtue of the rue. The dose of the juice is to two ounces; but the leaves are best for those that can eat them; or they may be taken in powder, from a scruple to a drachm, or the infusion may be drank as tea.

SABINA MAS, the *common Savine*, has a strong, woody root, that sends forth a stem or shrub, that extends more in breadth than in height, and is always green. The leaves are like those of German tamarisk, but are more hard and thorny, and have a strong disagreeable smell, with an acrid burning taste. On the top of the branches there are catkins or flowers, that have three stamina without petals, and which are not succeeded by any fruit; however, if the shrub be very old, it sends forth small greenish flowers, that are succeeded by small flattish berries, less than juniper berries, that are of a blueish black when ripe. It is cultivated in gardens, but in our climate seldom or never yields any fruit.

SABINA FOLIO CUPRESSI, the *berry-bearing upright Sabine*, has a root like the former, but produces a higher stem, for it rises to a sort of a tree, whose wood is reddish within, and is covered with a reddish pretty thick bark. The leaves are like those of the cypress tree, but more compact, with a strong penetrating smell, and a bitter, aromatic, resinous taste. The flowers consist of three pointed petals, as well as the calyx, which is divided into three parts, and is of a yellowish colour. The berries are roundish, fleshy, and on the lower part there are three tubercles, with a navel, armed with three small teeth, and they contain three oblong stones, that are convex on one side, and angular on the other. It grows among mountains, woods and other uncultivated places, and is also planted in gardens. The first is only used in medicine, and is incising, penetrating and aperient. The dose of the leaves in infusion, is half an ounce, and, in powder, to a drachm, in a glass of white wine. The distilled oil taken upon a lump of sugar, has the same virtues, and is employed by some to kill worms. This plant is a good remedy for opening obstructions

obstructions of the viscera, proceeding from a weakness of the vessels, and the clamminess of the fluids.

SALICARIA, *five* **LYSIMACHIA PURPURA**, *purple spiked Willow herb, or Loose Strife, with long leaves*, has a thick, woody, white, perennial root, with branches that sometimes rise to the height of a man, that are stiff, angular, branched, and reddish. The leaves are oblong, pointed, narrow, and of a deep green; they proceed from the knots of the stalks by pairs, and sometimes by threes, but very seldom by fours; they surround the stalks by intervals, and have a dry astringent taste. The flowers are verticillated in the middle of the branches, and are collected in spikes, of a fine purple colour, and each consists of six leaves or petals, in the form of a rose, with twelve stamina of the same colour, placed in the middle. The pistil rises from the middle of the flower-cup, and turns to a husk, or oblong pointed capsula, divided into two cells, full of small seeds. It grows in moist marshy places, and by the sides of waters and rivers; it generally flowers in June and July. This plant is deterfive, astringent, vulnerary, and cooling, but is seldom used in medicine, though some pretend it is an excellent remedy against the bloody-flux.

SALIX VULGARIS ALBA ARBORESCENS, *the common white Willow tree*, has a long, woody, white root, that produces a pretty large tree, with many firm green branches, covered with a smooth soft bark; the wood is white, pliant, and difficult to break. The leaves are long, narrow, downy, whitish, soft, and more or less dentated on the edges. The flowers and fruit grow distinctly from each other, and the male has only catkins, or long scaly spikes without petals, but there are two stamina in the center. The female willow has catkins like the former; but they have an oval, pointed pistil, somewhat longer than the fruit, which afterwards becomes a bivalved capsula of the same shape, full of oval tufted seeds. It grows every where in moist marshy places, and on the sides of brooks and rivers.

SALIX CAPREA *feu* **MINOR**, *feu* **SALIX LATIFOLIA ROTUNDA**, *the round leaved Willow*, has a root like the former, which produces a pretty large shrub, covered with a whitish bark. The leaves are roundish, broad, nervous, of a deep green above, and whitish and downy below, and the pedicle is often furnished with two small leaves, cut like ears; the catkins and flowers grow in distinct places, and it delights in moist woods, and along the sides of rivers and ditches, and is common in hedges. It flowers in March and April, and the wood, though more brittle than the white willow, serves to make hoops for barrels. The bark, leaves, and catkins, are said to be cooling and astringent, and they have been used in decoctions, and in all kinds of hæmorrhages, but they are now out of use.

SALVIA MAJOR, *the greater or common Sage*, has a perennial, hard, woody, fibrous root, with woody, branched, hairy, white, green stalks, generally square, with leaves placed opposite to each other; these are oblong, broad, obtuse, wrinkled, rough, and whitish, inclining to purple, and sometimes other colours; they are downy, thick, have a little juice, and are crenated on the edges. The flowers grow in spikes on the tops of the branches, and consist of a single labiated petal, with two stamina; they are of a bluish colour, inclining to purple, and are contained in a large calyx, in the shape of a horn, that is cut into five segments, and has the smell of turpentine. These are succeeded by four roundish blackish seeds, contained in a husk, that before was the flower-cup. It is cultivated in gardens, and flowers in June and July.

SALVIA MINOR, *five* **PINNATA**, *Sage of Pr-*

ue, has a root like the former, with several woody, whitish, downy stalks, as long as those of the common sage; but the leaves are less, whiter, wrinkled, rough, and generally attended at the base with two small leaves, in the shape of ears or wings. The smell and taste are stronger, more penetrating and aromatic. The flowers and seeds are like the former, and it is cultivated in gardens.

SALVIA HISPANICA, *Spanish Sage, with a lavender leaf*, somewhat resembles the former, but is less, and the leaves are narrower, and more white, as well as the flowers. It flowers in summer, but is very tender, and will not bear the cold very well. They may be all planted by slips, during any of the summer months, observing to shade and water them till they have taken root; after which they may be taken up and planted in a dry soil, where they may have the benefit of the sun. Sage of virtue is by most accounted the best, though the properties of all are much the same; they are cephalic, and very good against the apoplexy, epilepsy, palsy, and trembling of the limbs. They are all used in the manner of tea, against any of the disorders abovementioned, as well as for a preservative, and are very good for disorders of the brain, to promote the circulation of the fluids, to strengthen the stomach, and to help digestion. It is commonly said, that the Chinese wonder we should buy their tea, when we have so much sage of our own, which they take to be much more excellent. As to outward use, the leaves and flowers are often employed in fomentations, to strengthen the nerves, and to discuss the swellings of wounds.

SAMBUCUS FRUCTU IN UMBELLA NIGRO, *the common Elder tree with black berries*, has a woody, long, whitish root, and sometimes grows to a middle sized tree. The branches are large, round, and full of a white pith, that is green at first, and afterwards grey. The trunk is covered with a rough, ash coloured bark, full of cracks, under which there is another, which is green, and is used in medicine. There are five or six leaves that grow on one rib, which are dentated on the edges, and each rib is terminated with a single leaf, that is larger than the rest. The flowers grow at the tops of the branches in umbels, and consist of a single petal divided into five segments, that expand in the form of a rose; they are white, small, and have five stamina, with roundish apices; these are succeeded by soft, round, juicy berries, that are green at first, but black when ripe, and there are generally three seeds in each. It grows almost every where, in all parts of Europe, but delights in valleys and moist shady places. It flowers in May and June, and the berries are ripe in autumn. All parts of this tree are in use, and are generally known to have a purging and aperient quality. The dose of the rob of elder berries is from a drachm to half an ounce, in the bloody-flux, and to promote urine and sweat. The use of elder-berries in made wines is universally known.

SANICULA, *Sanicle*, has a thick root above, that is fibrous below, blackish without, and white within. It sends forth several broad roundish leaves, that are a little hard, smooth, dentated on the edges, and of a fine green shining colour; from among these there arises a stalk to the height of a foot, that is smooth, without knots, and reddish towards the root, and on the top there are several small flowers collected into an umbel, consisting of five white or red petals, placed in the form of a rose, with five stamina, and roundish apices. The petals are generally bent back to the calyx, on which they rest, and which turns to a fruit composed of two seeds, convex on one side, flat on the other, and prickly at the points, by which means they stick to the garments of those that pass by. Some of the flowers are always barren. It delights in shady woods, and in a flat moist soil, and

flowers

flowers in June. It has been long noted for its vulnerary virtues, and may be used in the manner of tea; but it is not now depended upon for any such purpose.

SATUREIA HORTENSIS, *garden Savory*, has a small, single, woody root, with stalks that rise to the height of a foot, or a foot and a half, which are round, reddish, and a little hairy and knotty. The leaves are small and oblong, like those of hyssop; they are a little hairy, and seem to have several holes, with a smell like that of thyme, but weaker. The flowers are small and labiated, consisting of a single petal; whose upper lip or crest is divided into two parts, but the lower lip or beard is divided into three, and has the middle part crenated; they proceed from the places where the leaves join to the stalk, somewhat loosely, but not in whorls or spikes, like most of this kind. They are white or purplish, with four silky stamina, that are succeeded by as many brownish round seeds, contained in a capsula, that was the cup of the flower. It is cultivated in gardens, by sowing the seeds on a bed of fresh light earth, in March; and when the plants are come up, they must be moved into other beds, placing them about four or five inches asunder each way. It flowers in the summer. It is aperient, inciding, and strengthening, but it is chiefly cultivated for the use of the kitchen, and is very proper for cold stomachs.

SAXIFRAGA ALBA RADICE GRANULOSA, *white round leaved Saxifrage*, has a root that sends forth several fibres, at the top of which there are several tubercles, somewhat larger than coriander seeds, which are partly purple, and partly white, and of a bitterish taste. The leaves are almost round, crenated on the edges, and pretty much like those of ground-ivy, only they are thicker and whiter. Among these the small stalks rise to the height of a foot, and are tender, hairy, purplish, and branched. The flowers grow on the top, and have five white leaves or petals, placed in the form of a rose, that have six stamina, with roundish apices. The flower-cup is divided into several segments, out of which the pistil arises, that, together with the flower-cup, turns into a roundish fruit, with two horns, and two cells full of small, longish, reddish seeds. This plant is common in moist meadows, in divers parts of England, and flowers in May. It is said to be good in disorders of the breast, and particularly in the moist asthma; but it is now almost neglected.

SAXIFRAGA VULGARIS, *Meadow Saxifrage*, has a perennial, long, thick, wrinkled root, white within, and hairy at the top, with stalks that rise from one foot to two in height, which are thick, round, furrowed, smooth, pithy, reddish towards the bottom, and branched. The leaves are smooth, of a deep green, and divided into longish, narrow-pointed, stiff segments, with an acrid taste. The flowers, which grow on the tops of the branches in umbels, have five leaves or petals in the form of a rose, of a whitish yellow. These are succeeded by fruit, composed of two short furrowed seeds, convex on one side, and flat on the other; they have a strong pleasant smell, and a vinous aromatic taste. It grows almost every where in moist places, and has been looked upon as exceeding good for the gravel, the root being a powerful diuretic; but it is not now much used for that purpose.

SCILLA VULGARIS RADICE RUBRA, *common red Squill*, has a root like an onion, or a bulb, sometimes as large as a child's head, composed of thick, red, juicy, clammy coats, placed one upon another, and underneath there are large fibres. It sends forth leaves a foot in length, and as broad as the hand, that are fleshy, green, and full of a clammy bitter juice. In the middle of these there arises a

stalk to the height of a foot and a half, on the top of which there are flowers, with six white petals, but without a calyx, disposed in a ring, and as many oblong stamina. These are succeeded by roundish fruit, on which are three corners, and they are divided into three cells, full of roundish black seeds. The root only is in use.

SCILLA RADICE ALBA, *the white Squill*, has a large root, but less than the former, and composed of several white coats, full of a clammy juice, and furnished underneath with many pretty thick fibres. It sends forth an upright naked stalk, to the height of a cubit, adorned at the top with several white flowers in the form of a star. The flowers appear before the leaves, and after them six thick, fleshy, large, deep, green leaves, proceed from the root, and lie upon the ground. This, as well as the former, grows in sandy places near the sea, and flowers in August and September. The seeds are ripe in November and December. These roots are brought from the Levant and Spain every year, and deserve to be cultivated in every good garden, for the beauty of their flowers. Those roots should be chosen that are fresh, of a middle size, sound, heavy, firm; and full of a clammy, bitter, acrid juice. They are excellent in disorders of the lungs, caused by a clammy, viscous phlegm; for which reason they perform wonders in the fits of the moist asthma, and in a disposition to a dropsy. However, in swellings arising from the dropsy, and in the inflammation of the kidneys, they are best given with nitre; that is, there should be double the quantity of this to that of the root; and the dose of the latter, in powder, is from four to ten grains. When given in this manner, it almost always operates as a diuretic. There are several preparations of this root kept in the shops.

SCORDIUM ALTERUM, *five SALVIA A. GRESTITIS*, *wood Sage*, has a woody, flexible, creeping, fibrous, perennial root, that sends forth several square, hairy, purplish, branched, pithy stalks, to the height of two or three feet. The leaves resemble those of sage of virtue, only they are broader and softer, like balm; they are also wrinkled, downy, of a dirty green, dentated on the edges, and have a bitter taste. The flowers grow in spikes, and consist of a single labiated petal, like those of German-der, and have the same shape, but are of a pale white colour, with four purple stamina, that are succeeded by four roundish, blackish seeds, contained in a capsula, that was the cup of the flower. It grows in uncultivated sandy places, and among hedges. It flowers in the summer, and continues a long while in flower. It has somewhat of a garlick smell, and is said to strengthen the stomach, kill worms, and promote urine; but it is now neglected.

SCORSONERA, *five SCORZONERA*, *Viper's Grafts*, has a root a foot long, as thick as one's thumb, blackish without, white within, and easy to be broken; it is full of a sweetish milky juice, and some account it good eating. It sends forth a round, furrowed, hollow stalk, to the height of two feet, covered with a little down, and divided into several branches. The leaves are long, pretty broad, smooth, and embrace the stalk by their base; they are sometimes a little sinuated or curled at the edges, terminating in a long narrow point, and are of a dark green colour. The flowers grow on the tops of the branches, and are large, yellow, and composed of semi-florets, with a long, slender, scaly flower-cup; these are succeeded by long white seeds, tufted at the top. It is cultivated in many kitchen gardens about London, and flowers in May and June. The root is accounted good both for food and physic; for it is said to strengthen the stomach, and to promote urine and sweat. Some take the boiled root to be very good food, and affirm it agrees with all ages and sexes.

sexes. The juice of the root, taken to three ounces in a morning fasting, Boerhaave affirms to be good in hypochondriac diseases, and to open obstructions of the viscera.

SCROPHULARIA AQUATICA, *water Betony*, has a thick perennial root, furnished with long fibres, and several stalks, that rise to the height of two or three feet; these are square, thickish, reddish in some places, and green in others, hollow within, pretty tender, full of juice, smooth and branched. The leaves are like those of the former, but more blunt at the end, and twice or thrice as large; they have a disagreeable smell and taste. The flowers are like those of the former, but a little larger, and of a reddish, rusty colour. These are succeeded by round pointed fruit, divided into two cells, that contain very small brown seeds. It is common in all watery places, and flowers in July and August. It is said to be an excellent vulnerary, and to have the same virtues as the former in other respects; but it is not now in much esteem.

SEDUM MAJUS VULGARE, *common great House Leek*, has a small fibrous root, with many oblong, thick, flat, pointed, fleshy, juicy leaves, that grow close to the ground; they are always green, and ranged in a circular order, in the form of a rose, they being convex without, and flattish within, and have a very little down on their edges. A thick, reddish, pithy stalk arises from the middle of these, clothed with the same sort of leaves as the former, only they are more narrow and pointed. It is divided at the top into several branches, on which are flowers, with five petals, placed in the form of a rose, and of a purple colour, with ten stamina, that have roundish apices or summits. The pistil rises from the flower-cup, which afterwards turns to a fruit, composed of many seed vessels, resembling husks, that are collected into a sort of a head, and are full of small seeds. It grows on the top of old walls, and on the roofs of houses; it flowers in July, and the stalk withers away in the autumn, when the seed is ripe. This plant is said to be cooling, cleansing, and astringent, and some give four ounces of the juice, to cure intermitting fevers, when there is no cold fit.

SEDUM PARVUM ACRE FLORE LUTEO, *Wall Pepper, or Stone Crop*, has a small fibrous root, with several low, short, slender stalks. The leaves are very small, somewhat thick, fat, pointed, triangular, and full of juice; the flowers are yellow, and consist of six petals in the form of a star, with many stamina and apices, or summits, of the same colour in the middle, that are succeeded by several sheaths or seed vessels, collected in the form of a head, and full of small seeds. It grows almost every where supported by its roots, or lying on old walls, and on the tops of cow houses; it flowers in June, and has a pungent, hot, burning taste. It is looked upon by some as an excellent remedy for the scurvy, and is particularly good for ulcerated gums, occasioned by that distemper.

SENECIO MINOR VULGARIS, *common Groundsel*, has a small, whitish, fibrous root, with several round, furrowed, hollow stalks, that rise to the height of a foot; these are sometimes reddish, branched, and hairy in certain places, exposed to the sun. The leaves are oblong, jagged, dentated, placed alternately, fixed to the stalks by a broad base, and terminate in a blunt point; the colour is of a dark green, and the flowers are placed in bunches at the top of the stalks; they consist of many yellow florets, disposed in the form of stars, and contained in a flower-cup, consisting of a single leaf, with five small stamina, that have cylindric apices or summits in the middle; these are succeeded by downy seeds, that altogether form a white head. It grows every where in fields, and by the way sides, in sandy

places exposed to the sun; as soon as the leaves wither, others arise; insomuch that it continues green all the year, and flowers in all seasons. It is accounted emollient and resolvent, and the juice, given to two ounces, kills worms. Some account it good in the jaundice, and even in spitting of blood. Boerhaave recommends the juice, mixed with oxycrate, as a gargle, in inflammations of the throat.

SERPILLUM VULGARE MINUS, *Mother of Thyme*, has a small, woody, perennial, brown root, furnished with capillary fibres, as also several small, square, woody, reddish, and low stalks, that are somewhat hairy. The leaves are small, green, roundish, nervous, a little broader than those of common thyme, and have an acrid, aromatic taste. The flowers grow on the tops of the stalks, disposed like a head, and generally of a purple colour; they consist of a single labiated petal, that has two lips, and is placed in a calyx, made like a horn. These are succeeded by small roundish seeds, contained in a capsula, that was the cup of the flower. It grows in uncultivated, mountainous, dry, sandy, stony places, and flowers in the summer. There are several sorts, but they have all the same virtues, and are accounted cephalic and stomachic, and may be used in the same manner as common thyme, though they are not quite so efficacious.

SILICUASTRUM, *five ARBOR JUDÆ, Judas's tree*, has a thick, hard, woody, perennial root, that sends forth a trunk, which in time becomes a middle sized tree, and is divided into branches at considerable distances from each other; the bark is of a blackish purple colour, on which papilionaceous flowers appear in the spring of a beautiful purple colour, and several of them are placed together; they are composed of five petals or leaves, the two lowermost of which are larger than the upper, which is contrary to other flowers of the leguminous kind. The pistil rises from the center of the flower-cup, is surrounded with stamina, and afterwards becomes a long flat pod, containing several seeds in the shape of kidneys. After these the leaves appear, which are round, and placed alternately on the branches; they are nervous, green above, and whitish below; the pods that contain the seeds are six inches in length, and very flat, purple, membranous, semi-transparent, and made in some sort like the sheath of a knife. This tree grows in hot countries, near rivers and brooks, on mountains and in valleys; it is cultivated in gardens for its beauty, and flowers in April and May. It was formerly preserved in green-houses as a curiosity; but of late years has been transplanted into the open air, where it thrives very well. It may be propagated by sowing the seeds on a bed of light earth, towards the middle of April, and earth should be sifted over them to the thickness of half an inch; if the season proves wet, the bed should be covered with mats. Some few of the plants rise the first year, but the greatest number in the second. About the middle of April following, just before they begin to shoot, they should be taken up carefully without breaking their roots, and planted in fresh ground as soon as possible. After they have continued here two or three years, they may be removed to the places where they design to remain. It is of little or no use in medicine, though the pods are said to be astringent. In the southern parts of France, the flowers are eaten as a sallad; but they are best when pickled like capers before they open.

SINAPI SILIQUA LATIUSCULA GLABRA SEMINE RUFO, *five VULGARE, common or red Mustard*, has a white, woody, brittle root, furnished with fibres, that sends forth a stalk to the height of four or five feet, which is pithy, hairy below, and divided into several branches. The leaves are large,

and much like those of radishes, but smaller and more rough. The small yellow flowers grow at the top of the branches, and consist of four leaves in the form of a cross; the pistil arises out of the flower-cup, which turns to a fruit or pod, divided into two cells by a partition, to which the valves adhere on both sides, and are full of roundish, reddish, or blackish seeds, of an acrid biting taste. This grows wild on the sides of ditches, among stones, and on land newly broken up, particularly in the Isle of Ely, where the land has been flooded for many years, and has afterwards been drained. It is also cultivated in gardens, and flowers in June.

SINAPI ALBUM, *five* **HORTENSE SEMINE ALBO**, *garden, or white Mustard*, has a single, woody, white root, furnished with long fibres, and sends forth a stalk to the height of a foot and a half, or two feet, which is branched, hairy, and hollow. The leaves are like those of radishes, and armed above and below with stiff prickly hair. The flowers are small, yellow, in the form of a cross like those of the former, and are succeeded by hairy pods, that terminate in an empty point, and contain four or five round, whitish or reddish seeds, that seem to be articulated or knotted. It grows wild in fields among the corn, and is cultivated in gardens; it flowers in May and June, and the seeds are ripe in July and August. Both kinds have the same properties, though the former is generally preferred. The seeds are stomachic, diaphoretic, antiscorbutic, and are good in hypochondriac diseases, as well as in sleepy disorders. The common use of mustard is known to every one, and is very proper for people of a cold constitution; because it creates an appetite, helps digestion, and attenuates the food. The powder of mustard seed, taken in white wine, is excellent against the scurvy, and some affirm it will cure a quartan ague, if taken in hot wine two hours before the fit. Some apply mustard outwardly to cure the hypogout, and also lay it to the feet, mixed with other things, in dangerous fevers. The white mustard is used as a salad herb, especially in winter, and in the spring. There are two other sorts of this plant, but these are the most useful.

SISARUM GERMANORUM, *the Skerrit*, has a root composed of several parts, as long as a man's hand, and as thick as the little finger, which are tender, brittle, wrinkled, and fixed to a sort of a neck; they are covered with a thin pale rind, and have a white pulp. The branches rise to the height of two or three feet, and are thick, knotted, and furrowed; the leaves are winged, and placed by pairs opposite to each other, on a rib that terminates in a single leaf, which is longer and broader than the rest; they are greener and softer than those of parsnips, and are slightly crenated on the edges. The flowers grow in umbels on the top of the stalks, and consist of four white leaves, placed in the form of a rose, with as many stamens in the middle. The flower-cup afterwards turns to a fruit, composed of two oblong seeds, which are furrowed on the back, and of a dark colour. It is cultivated in the kitchen garden, and flowers in June. It is thought by some to be the most wholesome and nourishing of all kinds of roots, though it is not very common in the gardens near London, but for what reason it is hard to say. It may be propagated by sowing the seeds about the middle of April, upon a moist, rich, loose soil; the plants will come up in May, and, when the leaves are decayed, the roots may be taken up for use as they are wanted; they will continue good in the ground from October till March, after which they are good for nothing. They are accounted good for all ages and constitutions; Boerhaave looks upon them as one of the best remedies for pissing and spitting of blood, and would have them dressed

several ways, that the patient may feed frequently upon them, especially if inclined to a consumption.

SISYMBRIUM AQUATICUM, *Water-radish*, with *dentated leaves*, has a long flexible root, furnished with fibres, and has a taste like that of radishes. It sends forth several branched, hollow, furrowed stalks, to the height of three feet; the leaves are large, long, sinuated, dentated on the edges, and especially towards the lower part. The flowers grow on the top of the branches, and consist of four yellow petals or leaves, disposed in the form of a cross; the pistil proceeds from the flower-cup, that afterwards turns to a fruit or pod, which is divided into two cells by a partition, to which the valves adhere on both sides, and contain small roundish seeds. It grows in marshes, brooks, rivers, ditches full of water, and flowers in spring. It is observable, that the leaves differ greatly from each other, according to the places in which they grow.

SISYMBRIUM SILVESTRE, *five* **RHAPHANUS AQUATICUS**, *Water-radish*, has an oblong white root, as thick as a man's little finger, that has an acrid pungent taste; the stalks, which rise to the height of three feet, are furrowed, hollow, and sometimes reddish. The leaves are oblong, pointed, cut deeply into jags, dentated on the edges, and are placed alternately on the stalks. The flowers grow on the tops of the stalks and branches, and are small, considering the size of the plant; they consist of four yellow petals or leaves, disposed in the form of a cross, with six stamens; they are succeeded by small short pods, divided into two cells, that contain small roundish seeds. It grows in ditches full of water, and in marshy places; it flowers in June and July. Some account the roots of both kinds good to eat, and use them in the same manner as radishes. They are aperient, cleansing, good against the gravel, scurvy, and dropsy; but they are seldom used either for food or physic.

SISYMBRIUM PALUSTRE REPENS NAS-TURTII FOLIO, *Water Rocket*, has a creeping, slender, whitish root, with an acrid taste, but not so strong as that of radish; the stalks are short, furrowed, slightly perforated, and are sometime reddish, and like those of the garden cresses. The flowers grow at the top of the branches, and are small, consisting of four yellow leaves or petals, that are succeeded by small cylindric pods, which are longer than those of the former kinds, and are divided into two cells by a partition, containing several small seeds. It grows on the sides of rivers in moist ditches, and in stony brooks; it flowers in July and August. It has the same virtues as the two former, but is now made little or no use of.

SISYMBRIUM ERUCÆ FOLIO GLABRO FLORE LUTEO, *Common winter cresses*, has a long, pretty thick, white, perennial root, with an acrid taste; the stalks are furrowed, firm, branched, pithy, hollow, and rise to the height of a foot and a half. The leaves are smaller than those of radishes, and are somewhat like cresses; they are of a deep, shining green; but have not so acrid a taste as the root. The tops of the stalks and branches are adorned with long spikes of yellow flowers, composed of four petals in the form of a cross; these are succeeded by slender, long, tender, cylindric pods, full of many small reddish seeds. It grows on the sides of ditches and brooks, and sometimes in fields; it is also cultivated in gardens for salads, in some parts of Europe; it flowers in May and June, and continues green all the winter. It is cleansing and vulnerary, and is good in the beginning of a dropsy, made use of in the manner of tea.

SMILAX LÆVIS MAJOR, *greater Bind Weed*, has a long, slender, whitish, perennial root, furnished with

with fibres; and the stalks are long, slender, furrowed, and climb upon trees and bushes, by means of their clasps. The leaves are in the shape of a heart, and are bigger and softer than those of ivy; they are also smooth and green, and the flowers are in the form of a bell, and as white as snow. The calyx is oval, and divided into five parts, with as many stamina, and flattish summits. These are succeeded by round fruits as big as cherries, wrapt up in the calyx, and contain two angular or pointed seeds, of a blackish colour, with a reddish cast. It is milky like other plants of the same kind, and grows almost every where amongst hedges and bushes; it flowers in summer, and the fruit is ripe in autumn. This plant is purgative and vulnerary, and the milky juice is of the same nature as scammony; but it must be given in a larger dose, that is, from twenty grains to thirty.

SMILAX LENIS MINOR, *small Bind Weed*, has a very long, slender, creeping, perennial root, with many small, weak, slender branches, that wind round the neighbouring plants. The leaves are in the shape of a heart, but more rough, nervous and small, than the former. The flowers proceed from the places, where the leaves join to the stalks, like small, whitish bells; but they are sometimes reddish or purplish. These are succeeded by roundish, small fruit, containing pretty large angular seeds. It is an anodyne, cleansing, vulnerary plant, and country people often use it to heal wounds, by applying it after it has been bruised between two stones; many are lavish of their praise of this plant on that account. There is another species of this plant, called the rough Bind Weed, with a red fruit; but it is of no use in medicine.

SOLANUM HORTENSE, *Common Nightshade*, of the shops, with black fruit, has a long, slender, hairy, dirty, whitish root, with a firm, angular stalk, that rises to the height of a foot and a half, is of a blackish green colour, and divided into several branches. The leaves are oblong, pretty large, soft pointed, and blackish; whereof some are angular, others crenated, others whole, smooth, and full of a greenish juice. The flowers grow on the branches, a little under the leaves, and consist of a single petal, divided into five parts, and expanded in the form of a star; there are as many yellow stamina, with oblong summits, and a pistil, which afterwards becomes a berry, like those of the juniper-tree; it is green at first, but when it is ripe it is soft, smooth, black, and full of juice. It grows on the sides of highways, near hedges and houses, and flowers in August and September. Some sorts of this plant have red fruit, and others yellow, which seems to be the principal differences. Some have given the leaves and fruit inwardly, but very rashly; for they are often attended with dangerous consequences, and therefore it is better to abstain from it entirely.

SOLDANELLA MARINA, *Scottish Scurvy-grass*, or *Soldanella*, has a small fibrous root, with several slender, pliant, reddish stalks, that creep on the ground; the leaves are roundish, smooth, shining, like those of the lesser celandine, but thicker, and full of a milky juice. The flowers consist of a single petal, in the shape of a bell, and are of a purple colour. The pistil, which rises from the lower part of the calyx, turns to a roundish membranous fruit, that contains angular black seeds. It grows frequently on the sandy shores of the sea, and flowers in summer; the whole plant is dried with the root, in which manner it is sent to us. It has a bitter, acrid taste, that is somewhat saltish, and is looked upon by some as very proper to purge off watery humours, particularly in a dropy, palsy, and the rheumatism. The dose of the powder, when dried, is from half a drachm to a drachm.

SONCHUS LAEVIS, *Smooth Sow Thistle*, has a

small, white, fibrous root, and a hollow, tender, furrowed, purplish stalk, that rises to the height of a foot and a half. The leaves are long, smooth, larger and more tender than those of dandelion, and are dentated on the edges. They are ranged alternately, are full of a milky juice, and some of them embrace the stalks with their broad bases. The flowers grow on the tops of the stalks and branches in bunches, and consist of yellow semi-florets, like those of dandelion, but smaller; these are succeeded by fruit, of a conical shape, that contain oblong, reddish, brown seeds, with a downy tuft. It grows almost every where, and flowers in May and June; rabbits and hares are fond of this plant.

SONCHUS ASPER, *prickly Sow Thistle*, has a root like the former, but the leaves are more entire, resembling those of endive, and they embrace their stalk with their base; they are of a deep shining green, and furnished with long hard prickles. It grows in the same places as the former, and flowers at the same time; it is full of a milky bitter juice. They are both of little or no use in physic.

STACHYS MAJOR GERMANICA, *base Hoarhound*, has a hard, woody, fibrous, yellowish, perennial root, with several stalks that rise to the height of two feet, which are thick, square, knotted, white, downy, and pithy. The leaves are placed opposite to each other at each knot, and are like those of white hoarhound, but longer, and whiter, and as well downy as dentated on the edges. The flowers are verticillated, and disposed like spikes on the top of the stalks, between the leaves; they are downy without, smooth within, and generally of a purple colour, though sometimes white; they consist of a single petal in the form of a tube, cut on the upper part into two lips, the uppermost of which is hollow like a spoon, and erect; but the upper lip is divided into six segments, of which the middlemost is much the largest; the pistil rises from the flower-cup attended by four embryos, that turn to as many roundish blackish seeds, contained in a capsula that was the cup of the flower. It grows in mountainous uncultivated places, and is cultivated in gardens, where it is propagated by seeds; it flowers in June and July. It is of little use in medicine, though Boerhaave recommends it against the apoplexy and the palsy.

STATICE, *Thrift*, or *Sea Pink*, has a long, thick, round, reddish, woody, perennial root, with several heads; from whence proceed a great number of long narrow leaves, like those of grass, and of a sea-green colour. From among these several stalks arise, to the height of a foot, that are upright, knotty, hollow, and almost all naked; the bunch of flowers grow at the top, and consist of five small whitish petals, in the form of a pink, and the calyx in the shape of a funnel, besides which there is a general scaly calyx. They are succeeded by seeds, pointed at each end, and contained in a capsula, that was the cup of the flower. It grows wild in Germany, and other inland countries, from whence it has been brought into England, and planted in gardens, to make edgings, and the sides of borders of flower-gardens; but it is now almost neglected, because they require transplanting every year. It continues a long while in flower, even to the very end of autumn. Boerhaave recommends this plant as an astringent vulnerary, and proper to stop internal hæmorrhages; for which purpose the juice is to be drank.

SUBER LATIFOLIUM, **PERPETUO VITENS**, *the Cork tree*, has a long, thick, hard root, that produces a middle sized tree, with a thick trunk, and a few branches. It has a thick, light, spongy bark, of a yellowish grey colour, that cleaves of itself, and parts from the tree; because it is pushed forward by another bark that grows under it. The leaves are like those of the scarlet oak, but they are larger,

larger, longer, green above, and sometimes a little prickly; the catkins and acorns are also like those of the same tree; but they are longer, blunter, and have a more disagreeable taste. The flower-cup is also bigger, and more hairy; it grows in the southern parts of Europe. The inhabitants of the places where they grow cleave the trunk of this tree lengthways, to take off the bark more readily, and then they put it over burning coals, laying stones thereon to render it flat; after which they clean it, and send it to other countries; this is what we call cork, that serves for so many different uses. When cork is burnt, and reduced to a fine powder, it is a very good remedy to ease the pains of the piles, mixed with the white of an egg, and the oil of sweet almonds.

TAMARISCUS GERMANICA, *the German Tamarisk tree*, has a root as thick as a man's thigh, covered with a thick bitter bark, from whence proceed several brittle stems, covered with a reddish bark, divided into several branches, and adorned with leaves, like those of common heath, of a sea-green colour, and an astringent taste. The flowers grow in spikes at the extremities of the branches, and consist of five white, purplish, oval petals, or leaves, with as many stamina and roundish yellow summits; these are succeeded by small oblong pods, which before were the pistils, and are full of small downy seeds. This shrub grows in Hungary, about Strasburg, Landaw, and Geneva, by the sides of running waters, and moist stony places. It flowers in May and June, and does not cease to bear flowers and fruit all the summer. They may be easily propagated in England, by laying down the tender shoots in the spring; but they are not of much value here because they have stragling branches.

TAMARISCUS NARBONENSIS, *the French narrow leaved Tamarisk tree*, has a thick woody root, divided into several branches, that sends forth several stems, which together form a bush or shrub, and sometimes a pretty large tree, with a trunk covered with rough grey bark. The leaves are small, long, and round, like those of the cypress tree and common heath; the flowers grow on the tops of the branches in bunches; these are of a whitish purple colour, and consist of five petals or leaves, that are succeeded by pointed fruit, which contain small downy seeds. It grows chiefly in hot countries, but may be propagated here like the former, though it is of no great value. It flowers generally three times a year, namely, spring, summer, and autumn; but the leaves drop off in the winter. The virtues of both these shrubs are much the same, and the root, bark, and leaves, are said to open obstructions of the viscera, and to attenuate gross humours, but they have been long out of use with us.

TANACETUM VULGARE LUTEUM, *common Tansey*, has a long, woody, fibrous, perennial root, which sends forth stalks to the height of two or three feet, which are round, streaked, a little hairy, and pithy. The leaves are large, long, winged, dentated on the edges, and disposed in pairs along a rib, terminating in a single leaf; however, botanists generally reckon all these but one leaf. The flowers grow on the top of the leaves in bunches or umbels, and consist of many florets, divided into several segments, and are of a beautiful yellow. The calyx or flower-cup is scaly, and contains an embryo, that turns to an oblong seed, which is black when ripe. It grows wild on the sides of highways, in fields, and on the edges of ditches; but it is every where planted in gardens, and flowers in July and August. The leaves have an acrid, bitter, aromatic taste, and are looked upon as stomachic, febrifuge, and sudorific, as well as althelmintic; for both the leaves and seeds have always been accounted good to kill worms. Some give the juice to three or four

ounces, in the cachexy, green sickness, and dropfy, in which last case it has succeeded, when other medicines have proved ineffectual. The seed of tansey may be used instead of wormseed; but is not so efficacious.

THALICTRUM LUTEUM, *five RUTA PRATENSIS*, *meadow Rue*, has a yellowish, fibrous, creeping root, with stalks that rise to the height of a man, which are stiff, furrowed, branched, hollow, and generally of a reddish colour. The leaves are large, of a shining green, and indented. The flowers grow on the tops of the branches, and consist of four petals, disposed in the form of a rose, about a cluster of green stamina; or chives, that surround a pistil, which afterwards becomes a fruit, in which the capsule are collected into a small head, that contain each an oblong, yellow, furrowed, small seed of a bitter taste; it has no flower-cup. It grows in meadows, and in moist marshy places, by the sides of brooks, and flowers in the summer. The root purges like rhubarb, for which reason it is called, in Germany, the rhubarb of poor people. It tinges the urine with a yellow colour, and is said to have the same qualities in all respects; but the dose must be three times as much. The juice of the leaves and flowers has been given, from one ounce to two, in all internal bleedings.

THLASPI, *Mithridate Mustard*, has a thick, woody, white root, with round, hairy, stiff, branched stalks, that rise to the height of a foot, which are furnished with leaves without pedicles, that are entire, and as long as the little finger, but broad at the base, and grow narrow by degrees to a point; they are crenated on the edges, and are of a greenish ash colour, or whitish, with an acrid pungent taste. The flowers are small, white, and disposed like those of shepherd's purse; they are composed of four leaves, placed in the form of a cross, with six stamina, that have pointed summits. These are succeeded by round or oval fruit, flattened in the shape of a purse, with a leafy border, slit on the upper side, and divided into two cells by a partition, placed obliquely with regard to the valve, and furnished with smooth, roundish seeds, that have an acrid pungent taste like mustard. It grows in uncultivated places, exposed to the sun, among corn, and on the tops of houses, and walls; it flowers in May, and the seed is ripe in June.

THLASPI ARVENSE, **SILIKUIS LATIS**, *Field Mithridate Mustard, with broad pods*, has a small, oblique, woody root, from whence arise angular, furrowed, winged stalks, that rise to the height of a foot. The leaves have no pedicles, and are long, broad, smooth, dentated, and of a blackish green, with a smell somewhat like garlick. The flowers grow in spikes at the tops of the stalks, and are composed of four white petals, disposed in the form of a cross, that are succeeded by broad, flattish, smooth pods, containing roundish, flattish, reddish brown seeds, of an acrid, hot, biting taste. It flowers in May, and the seed is ripe in June; it grows every where in the fields, and continues from the beginning of the spring to the end of autumn.

THLASPI ALLIUM REDOLENS, *Mithridate Mustard smelling like Garlick*, has a single white root, with a few fibres, that sends forth several leaves, of which some are jagged, others are surrounded by small teeth, and others again are without teeth or jaggs; they have generally long pedicles, and are nervous and green. From among these arise small stalks with leaves that embrace each other alternately; the flowers grow at the tops, and are composed of four small white petals, like those of shepherd's purse, and are disposed in the form of a cross. These are succeeded by flat fruit, in the shape of oval purses, which contain roundish flat seeds. All three have the same virtues; but the seeds are only made

made use of. They are said to promote urine, and to dissolve coagulated blood. The dose is from one scruple to two; but it must not be given to women with child, for fear of causing abortion, nor yet to patients of hot constitutions. The seed of the first is an ingredient in mithridate and venice treacle.

THYMUS CAPITATUS DIASCORIDIS, the *true Thyme of the ancients*, has a hard, woody root, furnished with fibres, that sends forth a small shrub to the height of a foot, which is divided into slender, woody, white branches, with leaves placed opposite to each other, that are small, narrow, whitish, and fall off in the winter. The flowers grow in heads at the top of the branches, which are small, purplish, labiated, and consist of a single petal. There are stamina, with slender summits, and the pistil is attended by four embryos, which become so many seeds, inclosed in a husk, which before was the cup of the flower. It is common in Candia, Greece, Spain, and Sicily, and grows on mountainous places, exposed to the sun. With us they are cultivated in gardens, and were formerly set in pots and tubs; but of late they have been found to endure the winter.

Besides this there are common broad leaved thyme, narrow leaved thyme, and broad leaved striped thyme, which have all the same virtues, and may be used indifferently in medicine. They are said to strengthen the brain, and to attenuate and rarify clammy humours. They help digestion, and may be of some service in shortness of breath; but they are chiefly used in the kitchen as a pot-herb.

All these plants may be propagated, either by sowing the seeds or parting the roots; and the proper season for both is at the latter end of March.

THYSSELINUM, *Milky Parsley*, has a long, reddish, brown root, full of a milky fluid, that has a hot, sharp, strong, disagreeable taste. It sends forth a stalk to the height of four feet, which is hollow, channelled, and branched. The leaves are ferulaceous, that is resembling that of the ferula, and have a milky juice like the root. On the tops of the branches there are flowers in umbels, consisting of five yellowish white petals, in the form of a rose, with as many capillary stamina with roundish summits. These are succeeded by oval, large, flattish seeds, placed by pairs, and radiated on the back. It grows in moist, marshy places, on the sides of ponds and brooks, and of ditches full of water. It flowers in June and July, and the seeds are ripe in the beginning of August. The root has been used in decoction, to promote urine, but it is not very safe, on account of its acridity. Boerhaave affirms, that the milk has the same purging quality of scammony, and may be used instead of it.

TILIA, the *Lime*, or *Linden tree*, has a deep spreading root, that sends forth a very large trunk, so full of branches, that it is very proper for shady walks. It is covered with a smooth ash-coloured bark, which is yellowish or whitish within. It is so tough and flexible, that in some places, where better materials are scarce, they make cords and cables therewith. The leaves are broad, roundish, and terminate in a point, and are a little downy on both sides, as well as dentated on the edges; the flowers consist of five whitish petals, which are placed orbicularly, and expand in the form of a rose. There is a long narrow leaf growing to the foot stalk of every cluster of flowers, each of which has a great number of stamina, with yellow summits, and are sustained by a cup cut into five white thick parts. These are succeeded by a pod of the size of a large pea, which are almost round or oval,

as well as woody, angular, hairy, and contains one or two roundish blackish seeds, of a sweetish taste. Besides this, there are the small leaved lime tree, the red twigged lime tree, the Carolina lime tree, the striped leaved lime tree, and the American black lime tree.

The three first sorts are common in England, and are cultivated in most nurseries; but the *Carolina* and *American* are not yet very common. They are all easily propagated by layers, which in one year will take good root, and then may be taken off and planted in a nursery, at four feet distant, row from row, and two feet asunder in the rows. The best time to lay them down is about Michaelmas, when the leaves begin to fall, that they may take root before the frost comes on; it is likewise much the best to remove them in autumn. They may remain here five years, and the large side shoots must be pruned off, to cause them to advance in height, but the small twigs must not be cut off from the stems, because they are necessary to retain the sap for the augmentation of their trunks. If the soil be a fat loam, they will in that time be large enough to plant where they are to remain. The timber of the lime tree is used by carvers, because it is a light soft wood; as also by architects for framing models of their buildings; not to mention the turners, who make bowls and dishes therewith.

With regard to their medicinal virtues, the flowers are said to be good in all disorders of the head, and may be drank like tea with sugar. Some make a conserve of them for the same purpose, and the dose is from half an ounce to an ounce. Some affirm them to be good in the stone and gravel, and to dissolve coagulated blood. The berries are astringent, and good against all sorts of hemorrhages and loosenesses; the dose is a drachm in powder.

TINCTORIUS FLOS, or **LUTEOLA**, *Dyer's Weed*, or *yellow Weed*, by some called *Weld* or *Would*, has a root generally as thick as a man's little finger, which is single, woody, white, and has a very few fibres. The leaves are oblong, narrow, smooth, and not dentated, though sometimes they are a little curled. Among these there rise stalks to the height of three feet, which are round, hard, smooth, greenish, branched, and furnished with leaves that are less than those below; and on the tops there are flowers, composed of three unequal petals, of a beautiful yellowish green colour. These are succeeded by almost round capsula, terminated by three points, which contain several roundish, small, blackish seeds. It is very common in England, and grows upon dry banks, and on the tops of walls and buildings, almost every where. It is of great use among the dyers, and will grow on the poorest sort of land, provided it be dry. The seeds should be sown in the middle of August, soon after they are ripe; they will come up the first moist weather, and will grow very strong the same autumn, provided they are sown by themselves. When they are pretty strong, they should be howed like turneps, to destroy the weeds, and to thin them where too thick. The seed must not be too ripe when gathered, for then it will fall out; nor yet must the stalk be under ripe, for then it will be good for nothing. It must be bound in handfuls, and then set to dry like flax, taking care not to shake out the seed; which is usually sold for ten shillings a bushel, and a gallon will sow an acre. It is used for dying bright, yellow, and lemon colours. A great deal of this is sown in Kent, especially about Canterbury; and they cultivate it in Languedoc and Normandy, in France, where they boil it in water with alum, and then it will colour white wool yellow, and blue stuffs green. It is said to be

an opening medicine, and to be good against the jaundice and cachexy; but it is seldom or never used with us.

TITHYMALUS, *Spurge*, is of three kinds, namely, *German Spurge*, *Garden Spurge*, and *narrow leaved Wood Spurge*.

German SPURGE has a thick, white, woody, creeping root, which sends forth several stalks, to the height of two or three feet, about as thick as a man's little finger; these are reddish, branched, and beset with leaves alternately placed, and these are smooth, oblong, green, and perish in the winter with the stalks. The flowers grow on the tops of the branches, and are disposed in umbels. They consist of one single leaf or petal; in the shape of a slipper, whose pointal afterward becomes a tricapular fruit, divided into three cells, each of which contains a roundish seed full of a white substance. It grows upon the sandy banks of rivers, and other marshy places; it is common in Germany, on the banks of the Rhine, from whence it has its name. It is sometimes in gardens, and flowers in May and June. It is cultivated full of an acrid milky juice, like other plants of this kind.

Garden SPURGE has a single root, with a few capillary fibres, and sends forth a stalk to the height of two feet, as thick as a man's thumb, which is round, solid, reddish, branched at the top, and furnished with many leaves three inches long, in the shape of those of willow; they are of a bluish green, smooth, and soft to the touch. The flowers grow on the tops of the branches, and are each composed of four thick petals, with several slender stamina, and roundish summits; they are encompassed with two pointed yellowish leaves, which seem to be in the room of a cup. They are succeeded by fruits, that are larger than those of the other plants of this kind, which have three corners, divided into three cells, with a seed in each as big as a pepper-corn. The whole plant is full of a milky juice, and is almost every where cultivated in gardens. It flowers in July, and the seed is ripe in August and September. Beggars make use of this milk very frequently to disfigure the skin, in order to move compassion. If the leaves or fruit of this plant are thrown into ponds, it makes the fish rise to the surface of the water, where they lie as if they were dead; but they may be recovered speedily by changing the water.

TORMENTILLA SYLVESTRIS, *wild Tormentil*, or *Septfoil*, has a root about as thick as a man's finger, which is rough, unequal, sometimes strait, and sometimes crooked, of a dark colour without, and reddish within; it is a kind of a tubercle, and is furnished with a few fibres. The stalks are slender, weak, hairy, reddish, and about a foot long; they lie on the ground, and are surrounded with leaves by intervals, like those of six leaved grass; they are hairy, and there are commonly seven leaves at the top of the foot stalk. The flowers consist of four yellow petals, placed like a rose, supported by a calyx or cup, in the form of a basin, divided into eight parts, of which four are large, and four are small; they are placed alternately, with sixteen stamina in the middle. These are succeeded by a globular fruit, which contains many seeds that are small and oblong. It grows almost every where, in dry pastures and commons, in most parts of England; it flowers in May, June, and July, and the root is principally used in medicine; but the Tormentil of the Alps is much more valuable, on account of its superior virtues. The root has a styptic very bitter taste, and is accounted good to stop loosenesses, hæmorrhages, and the like. The dose in decoction is from half an ounce to an ounce, and in powder from half a drachm to a drachm.

TRIFOLIUM PRATENSE PURPUREUM,

common meadow Trefoil, with a purple flower, by many called *Honey-suckle*, has a root as thick as a man's little finger, which is long, round, woody, creeping, and fibrous. The stalks rise to the height of a foot, or a foot and a half, and are slender, channeled, and sometimes a little hairy. The leaves are partly round, and partly oblong, and there are three together on the same pedicle, marked on the middle with a spot, in the shape of a heart, which is sometimes white, and sometimes dark. The flowers grow on the tops of the stalks, and have some resemblance to the papilionaceous kind; are disposed in a head, or short thick spike, of a purplish colour, and have a juice at the bottom, as sweet as honey. They are succeeded by small round capsula, each of which is inclosed in a calyx, and terminated by a long pedicle, containing a seed, in the shape of a kidney. It grows almost every where in meadows and pasture grounds, flowering in April, May, and June. The flowers are greatly sought after by bees, and the whole herb is excellent for feeding cattle.

TRIFOLIUM ARVENSE HUMILE SPICATUM, *Hare's-foot Trefoil*, is the lagopus of the shops, and has a slender, woody, fibrous, crooked, white, annual root. It has several stalks, about six inches high, which are branched, strait, and covered with a whitish down. Three leaves are placed together upon one pedicle, which are smaller than common trefoil, and are downy and whitish, especially upon the back. The flowers are small, whitish, papilionaceous, and fixed on hairy soft spikes, which resemble the feet of a hare; the colour is ash, inclining to purple. These are succeeded by capsulae, inclosed in a calyx, each of which contain a reddish seed like a small kidney. It grows every where in fields among corn, and flowers towards the latter end of summer, continuing till October. Most physicians affirm it is good to stop loosenesses of every kind, if the decoction be used as common drink. If the seed happens to be mixed with wheat, it turns the bread of a reddish colour, which had like to have caused an insurrection at Paris; for the people affirmed the bakers mixed blood with their flower.

TRIFOLIUM BITUMINOSUM, *Trefoil, smelling of Bitumen*, has a hard, woody, fibrous root, which sends forth a sort of a shrub, about two feet high, and is divided into several stiff channeled branches, which are sometimes whitish, and sometimes blackish. The leaves grow by three's on the same pedicle, which, when they first appear, are round, but grow longer afterwards, and terminate in a sharp point; they are whitish, downy, clammy to the touch, and have the smell of bitumen. The flowers grow on the tops of the stems and branches, are disposed like an oblong head, and are papilionaceous, and of a violet purple colour; they are sustained by an oblong, channeled, hairy calyx. These are succeeded by a capsula inclosed by the calyx, which contains a rough, pointed, blackish seed, of the same smell with the rest of the plant. It grows in Candia, Sicily, Languedoc, and the southern parts of France; on stony hills near the sea, and is planted here in some gardens for the sake of variety, and kept in pots. It flowers in June, July, and August, and will stand the winter, if it is not too severe. The juice of this plant has been accounted a secret against a cancer, and has been given from one spoonful to two, for that purpose.

TRIFOLIUM HÆMORRHOIDALE, *pile Trefoil*, has a long, hard, woody root, with several stalks, which rise to the height of two or three feet, are slender, round, hairy, woody, branched, and make a kind of a shrub, furnished with downy, whitish, and roundish leaves, which grow by three's on the same pedicle, and have two appendages at the base. The flowers grow at the extremities of the stems and branches, and are papilionaceous, whitish, and supported

ported by a hairy calyx. They are succeeded by short thickish pods, of a reddish brown colour, that contain a round small seed, yellowish within. It grows in the southern parts of France, and flowers in the summer. It has been counted an excellent remedy for the piles; and some affirm, a drachm or two of these leaves, given in powder, has been of great service in that disorder.

Bird's-foot Trefoil is the *Trifolium Corniculatum* of the shops, and has a woody, long, black root, divided into several branches, and furnished with fibres. The stalks are slender, branched, and lie upon the earth; and the leaves are placed as in other trefoils, only there are two small flat leaves that grow underneath them, which are sometimes smooth, and sometimes a little hairy. The flowers are papilionaceous, grow in umbels, and are sometimes yellow, and sometimes greenish, like those of broom; the calyx is dentated, and in the shape of a horn; the flowers are succeeded by capsulæ or pods, in the form of a cylinder, which contain several roundish seeds, in the shape of kidneys. It grows almost every where, and flowers in summer; it is exceeding good for cattle, but is of little use in medicine.

TULIPA, Tulip, is a lily flower, generally composed of six petals or leaves, in the shape of a pitcher: the pointal, which arises from the middle of the flower, is surrounded with a stamina, which afterwards becomes an oblong fruit, that opens into three parts, and is divided into three cells, full of plain seeds, which rest one upon another, in a double row. The root is coated, bulbous, and there are fibres on the lower part. There are several kinds of tulips, which there is no occasion to enumerate, because they may all be seen in one good garden; but the best have a tall strong stem. The flower consists of six leaves, three within and three without, and the former should be longer than the latter. Their bottoms should be proportioned to the top, and their upper parts should be rounded off, and not terminate in a point. These leaves, when open, should neither turn inward nor bend outward, but rather stand erect; and the flower should be of a middling size, neither too large nor too small; the stripes should be small and regular, arising from the bottom of the flower, and the chives should not be yellow, but of a brown colour. They generally divide tulips into three classes, namely, the early flowers, the middling flowers, and the late flowers; but they are best divided into early and late, of which the last are the best.

TUSSILAGO, Colt's-foot, has a long, slender, whitish, tender root, with stalks that rise to the height of a foot, which are hollow within, downy, reddish, and covered with leaves without pedicles. These are long pointed, placed alternately, and at the top of the stalk there is a beautiful, round, radiated flower, resembling that of dandelion, with capillary stamina, that have cylindrick summits. These are succeeded by several oblong, flattish, downy seeds. After the flowers, the other leaves appear, which are very large, a little angular, almost round, green above, and whitish and downy below. It grows in moist places, and on the borders of rivers, brooks, ponds, and ditches. It flowers about the end of February and beginning of March. *Colt's-foot* is an excellent medicine to abate the sharpness of the humours, to cleanse ulcers of the breast, and to facilitate expectoration. There are a great many that are troubled with the asthma, who cut the leaves small, and mix it with tobacco for smoking; and affirm they find great benefit thereby. Both the flowers and leaves are used in pectoral decoctions; and Dr. Hillary, physician to the king of Prussia, cured a great many consumptive children, by feeding them with colt's-foot leaves, boiled and buttered.

VALERIANA HORTENSIS, Garden Valerian,

has a wrinkled root, of the thickness of a man's thumb, placed near the surface of the ground, and furnished with thick fibres, of a yellowish or brown colour, that cross each other. The stalks are about three feet high, and are slender, round, smooth, hollow, branched, and furnished with leaves, placed opposite to each other by pairs. Some are smooth and entire, while others are cut deeply on each side, generally terminate in a roundish point. The flowers grow in umbels on the tops of the stalks and branches, and are of a purplish white colour, with a sweet smell, not unlike that of jessamine. Each of these is a sort of tube, cut into five parts, with a few stamina that have roundish summits. They are succeeded by flattish, oblong, tufted seeds. It is cultivated in gardens, and propagated by parting the roots, either in the spring or autumn; they should be planted on beds of fresh, dry earth, about eight or ten inches asunder, and should be watered till they have taken root. The wild sort is now universally preferred for medicinal uses, and therefore no more need be said of this.

VALERIANA SYLVESTRIS MAJOR, Great wild Valerian, has a fibrous, whitish, streaked root, with a very strong smell when it is dry, and an aromatic taste; the stalks rise to the height of a man, and are strait, slender, hollow, channeled, knotty, and a little hairy. The leaves resemble those of garden Valerian, but are more divided, greener, and dentated on the edges; they are a little hairy or downy underneath, and have several large veins. The flowers grow on the tops of the stalks and branches in umbels, and are of a purplish white colour, like those of the former; the seeds are tufted or downy, for which reason they are carried about with the wind. It generally grows on dry chalky land, and shady places, in divers parts of England. It flowers in May and June, and the seed is ripe in July. The root is bitter, styptick, and has a disagreeable aromatic smell; it is much cried up against the epilepsy, and is sudorifick as well as hysteric; it is accounted good for the asthma, and all kinds of convulsive disorders. It may be taken in decoction, from two drachms to half an ounce, and, in substance, from one drachm to two. It should be taken up in the spring, before the branches appear, and dried in the shade. Several physicians affirm, they have cured a great number of epileptick patients with the powder of the root of wild Valerian, given to a drachm in a sudorifick decoction, and continued for some time.

VALERIANELLA, Corn Salad, or Lambs Lettuce, has a slender, fibrous, or white annual root, and a stalk about six inches high, which is weak, round, crooked, channeled, hollowed, knotted, branched, and commonly lies upon the ground. It is generally subdivided into two at each knot, and these last into several branches. The leaves are oblong, pretty thick, soft, tender, and placed by pairs, opposite to each other; the colour is a pale green; some of them are entire, and others crenated, without pedicles. The flowers grow on the tops of the branches, are small, of a purplish white colour, and placed in umbels; they each consist of one leaf or petal, cut into five parts, and are succeeded by roundish, flattish, wrinkled, whitish seeds, which fall off before they come to maturity. It grows almost every where, among corn, and is cultivated in gardens, where it is sown in September for winter use. It is usually mixed with salads, and will continue till April. It is said to have the virtue of lettuce, and to be good in the rheumatism, scurvy, and gout; but it is now never used for these purposes. Young lambs are said to be fond of it.

VERATRUM, White Hellebore, is of two sorts, one of which has a greenish flower, and the other a dark red flower. The former of these has been mentioned

mentioned before, in the first chapter; but as nothing was said of the cultivation, we shall take notice of it here, especially as it is accounted a pretty ornament for gardens. They should be set on the open borders of a pleasure garden, and from each head of the root, a flower stem will be produced, about three feet high, with a spike of flowers about a foot long at the top; the red flowers are generally preferred, on account of their colour. They may be propagated by parting the roots, either in autumn or the middle of March, just before they begin to shoot; and should be planted in a light, rich, fresh soil, in which they will thrive exceeding well. They should not be removed above once in three or four years, by which time they will be very strong, and afford many heads to be taken off.

VERBASCUM, *Great white Mullein*, has a single, oblong, thickish, woody, white root, with a few fibres; and the stalk, which rises to the height of four or five feet, is thick, round, hard, woody, and crooked, with a sort of wool or cotton; the leaves are long, broad, woody, white on both sides, partly lying upon the ground, and partly fixed to the stalk alternately, with appendages, which seem to render the stalk winged. The flower consists of one leaf, in a circular form, which is cut into five parts, and joined to each other by a tuft; it is yellow, and surrounds the greatest part of the tops of the stalk and branches. The flowers are succeeded by oval shells, terminating in a point, divided into two cells, which contain a great number of small, angular, blackish seeds. It grows in sandy places, by the side of highways, and sometimes on walls; it flowers in June, July and August.

VERBASCUM FOEMINA FLORE LUTEO MAGNO, *Female Mullein*, with a large yellow flower, has a long, thick, woody, single, white root, like the former, and the stalk, which rises to the height of four or five feet, is thick, round, hard, downy, and a little branched. The leaves are round, long, soft, downy, and white; and the flowers are like the former, having five stamina in the middle, with purple summits. These are succeeded by almost round capsula, pointed at the end, and divided into two cells, which contain several angular brownish seeds. This plant grows in the same places as the former, and flowers the second year after it is come up towards the end of summer, and in August. They both may be cultivated in gardens, by sowing the seeds in August, on a bed of light earth, and in an open situation; but it is seldom done except in botanick gardens for variety. They both have the same virtues, and the leaves and flowers are in use. The decoction has been given in disorders of the throat, in violent coughs, in the bloody-flux, the gripes, and a tenesmus. The flowers are said to be pectoral, proper to abate the acrimony of the humours, to cure itching of the skin, and the outward and inward piles.

VERONICA MAS, *common male Speedwell*, or *Fuellin*, has a slender, fibrous, spreading root, which sends forth several slender, long, round, knotty, hairy stalks, generally lying on the surface of the ground. The leaves grow by pairs opposite to each other, and are like those of a plumb-tree; they are downy, dentated on the edges, and have a bitter acrid taste. The flowers are disposed in spikes, like those of germander, and are small and bluish, and sometimes white, with two stamina of the same colour, with oblong summits. The flower consists of one leaf, which is divided into four parts, and is succeeded by fruit in the shape of a heart, placed in two cells, which contain several round blackish seeds. It grows wild in the woods, and other shady places in divers parts of England. There are some other species of this plant; but this is the only one used in medicine, and is said to have so many virtues, that an entire trea-

tise would scarce contain them; besides which some call it the European tea. In general, it is sudorifick, vulnerary, detergent, diuretick, and proper to cleanse the lungs. Hence it is good in a dry cough, the asthma, ulcers of the lungs, and spitting of blood. It opens obstructions of the bowels, promotes the circulation of the blood and humours, and is excellent in the gravel. It is best used in the manner of tea, and is very good in sleepy disorders.

VIOLA MARTIA PURPUREA FLORE SIMPLICE ODORO, *common purple Violet*, with a sweet scented flower, has a fibrous, thick, or tufted root, that sends forth many almost round leaves, as large as mallows, dentated on the edges, green, and having long pedicles. From among these there arise slender pedicles, which have each a small flower, of a purplish blue colour, with a very agreeable smell. It is composed of five small leaves, with as many stamina, that have blunt summits, and a kind of a spur; the calyx or flower-cup is divided at the base into five parts. When the flower is gone, there remains a capsula, or oval shell, which, when ripe, opens into three parts, in which are almost round seeds, connected to the sides of the shell, which are less than those of coriander, and of a whitish colour. It grows in shady places, in ditches, and the sides of hedges, as well as against walls, where they readily multiply with their long creeping filaments, which take root here and there. They flower in March, and do not lose their leaves, nor the verdure, during the winter. Besides this, there are no less than twenty-eight sorts, and about eight of them serve to make agreeable varieties in gardens and wildernesses, by placing them under hedges, and other shady places. They may be easily propagated, by parting the roots; the best time for which is about Michaelmas. The leaves and flowers are used in medicine, and sometimes the roots, by infusion, three ounces of which will purge upwards and downwards. The flowers are a little purgative, and we are assured, that a drachm of their powder, taken in water-gruel, is a good purge; but they are generally used to make a syrup of, which, when well managed, is of a very fine colour.

VISCUM, *Mistletoe*, has a green root, which is a little woody in the middle, and sends forth a shrub about two feet high. The stalks, which are sometimes as thick as one's little finger, are woody, heavy, compact, knotted, and of a brownish-green. There are a great number of flexible woody branches. The leaves are placed by pairs opposite to each other, and are oblong, thick, fleshy, hard, and pretty like those of the great box, but longer, and roundish at the end. The flower consists of one leaf, in the form of a basin, and is generally divided into four parts, and beset with tubercles or warts. The ovary of the female flowers is placed in a remote part of the plant from the male flowers, and consist of four shorter leaves; these turn to a round berry, full of a clammy substance, in which is a plain seed, in the shape of a heart. It grows almost on all kinds of trees, according to some authors, and is always produced from seeds, which will not grow in the ground like other plants. It is supposed that the mistletoe-bird or thrush, which feeds upon the berries of this plant in winter, when they are ripe, often carries the seeds from tree to tree; for the clammy part of the berry, which immediately surrounds the seed, sometimes sticks fast to the outer part of the bill of the bird, which, to disengage himself from, he strikes it against the branches of a neighbouring tree; and by that means leaves the seeds, sticking on the bark, which will grow the succeeding winter. It may be propagated by art in the same manner. The trees it is found commonly upon, are the apple and ash; and it is sometimes, though but seldom, found on the oak;

oak; which perhaps is the reason why that is cried up more than others; but without any sufficient reason. Mistletoe is looked upon as a great anti-epileptic, and the dose of it in powder is from one drachm to two. Simon Pauli cries it up against the pleurisy, and orders one drachm of the powder, in four ounces of barley-water. The berries purge upwards and downwards, with great violence, and therefore are not proper to be given inwardly.

VITIS, *the Vine*, has a long woody root, which sends forth a climbing tree, that has clasps at the joints, by which it fastens itself to whatever plant stands near it. The leaves are large, broad, and almost round, green, shining, cut, a little rough to the touch, and of an astringent taste. The flowers are small, and are each composed of five petals or leaves, disposed in a circular order. They are of a yellowish colour, with as many upright stamina. When the flowers are fallen, they are succeeded by round or oval berries, lying close to each other in clusters, which are green at first, and, as they ripen, become white, red, or black; they are also full of a pleasant juice. This tree is cultivated in most hot and temperate countries, and rises to a great height in a short time, if it be left to itself, and not cut. In some countries it will rise to the top of the highest trees, and have a stem of a prodigious size. It flowers in the summer, and the grapes are ripe in autumn.

All sorts of vines are propagated either from layers or cuttings, the former of which is greatly practised in England, but the latter is preferred by Mr. Millar; and he lays down excellent rules for their cultivation, which we have not room to take notice of here.

The buds of the vine, as well as the leaves, are astringent, and were used by the ancients to cure loosenesses; at present, there are some in France that give the powder of the green leaves, dried in the shade, to a drachm, for the same purposes. The use of the grapes is universally known, they being proper either for eating, or making of wine. When they are green, they produce the liquor which is properly called verjuice; and, in this state, it is a little astringent, serves to abate the heat of the stomach, and to stop a bilious looseness, as well as to recover the appetite. It is made use of in France in the same manner as our common verjuice made with crabs. Of the juice of ripe grapes they make a sapa or rob, by evaporating it over the fire, till a third part remains. This is a little astringent and styptic, which are made use of in France to prepare quinces with; and then it is said to be excellent to stop loosenesses, and to strengthen the stomach. As for wines, they vary greatly, with regard to their colour, smell, taste, and consistence; all which are different, according to the different kinds of grapes of which the wine is made. Good generous wine, of any sort, is an excellent cordial, if properly used, and of late has been found to be of great service in all flow nervous fevers; for they will recover the patient, when other things fail. However, there are some wines that are too astringent for common use, and consequently produce costiveness; for which reason they must be unwholesome, unless drank in small quantities; however, they are proper enough for those whose stomachs are relaxed. Meagre acid wines agree with those of a bilious constitution, to restrain the effervescence of the blood, but with none else. Strong spirituous wines are most proper to raise the spirits, and to restore the exhausted strength, especially when they are not drank too commonly.

VITIS IDÆA, *FOLIIS OBLONGIS CRENATIS*, *common black Wortle, or Bilberry*, has a slender, woody, hard root, often creeping under the ground, which sends forth a small shrub, about a foot in

height, with several slender branches, that are angular, flexible, and difficult to break, as well as covered with a green bark. The leaves are oblong, and about the size of those of box, but not so thick; they are green, smooth, slightly dentated on the edges, and have an astringent taste. The flowers consist of a single leaf, in the shape of a pitcher, and are connected to short pedicles, of a reddish white. There is a small lasting flower-cup, in which is the germen, attended by eight stamina, with forked summits. The germen afterwards becomes a soft, globular, umbilicated berry, of the size of juniper berries, and of a deep blue, or blackish colour. It grows very common on large wild heaths, in many parts of England; but it is never cultivated in gardens, because it will not thrive therein. In those parts where they are common, the poor people gather them, and bring them to markets to sell, or cry them about the streets. It is common to eat them with milk or cream. Some take the juice of these berries, and boil them to the consistence of a rob, with sugar, which is said to be good against a common looseness, and to temperate the effervescence of the bile. Several vintners in France make use of these berries, to colour their white wines red, as well as to increase the quantity thereof; and it were to be wished, that nothing worse was any where used to adulterate this liquor. Some likewise make use of the juice to colour linen, as well as paper, blue.

ULMARIA, *Meadow-Sweet*, has a pretty thick root, as long as one's finger, which is blackish without, of a reddish brown within, and has a few reddish fibres; it sends forth a stalk, to the height of three feet, which is strait, angular, smooth, reddish, firm, hollow, and branched. The leaves are placed alternately, and are composed of several other oblong leaves, not much unlike those of drop-wort. They are dentated on the edges, wrinkled, and green above, but whitish below. The flowers are small, and grow in bunches on the tops of the stalks and branches; they each consist of several petals or leaves, of a whitish colour, in the form of a rose, and have an agreeable smell. These are succeeded by a fruit, composed of many little membranaceous crooked hulks, gathered into a sort of a head, each of which contains a small seed. It grows wild in moist meadows in most parts of England, and the flowers in the middle of June make a fine appearance among the grass. The seeds are ripe in autumn. This plant is said to be sudorific, cordial, and vulnerary, and some recommend its decoction in malignant fevers; others greatly praise it against fluxes, and internal hurts, but it is not to be depended upon on these accounts. A drachm of the extract of the root is sudorific, if it be taken for two or three days together. The tender leaves and flowers of this plant, put into wine, mead or beer, give them an agreeable taste and smell, which some are very fond of.

ULMUS, *the Elm tree*, has a thick, hard, woody root, which spreads greatly in the ground, and sends forth a large branched tree, with a thick trunk, covered with a chapped bark, which is rough, and of a reddish ash colour without, but whitish within. The wood is strong, hard, inclining to yellow, with a reddish cast, and the leaves are broad, wrinkled, veinous, oblong, dentated on the edges, terminating in a point, of a pretty deep green above, with short pedicles, and crossed longways by a nerve, which does not appear so much on one side as the other. The flower, which appears before the leaves at the top of the branches, consists of a single leaf, shaped like a bell, furnished with several dark coloured stamina, and from the bottom arises the pointal, which afterwards turns to a membranaceous and leafy fruit, almost in the shape of a heart. In the middle of which is placed a seed-vessel, in the shape of a pear,

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containing a single seed of the same shape. This tree grows in plenty all over England, and is propagated by seeds; and suckers that rise from the roots of old trees in such plenty, as hardly to be rooted out, particularly in hedge-rows, which, when left undisturbed, will send forth young plants every year; from whence the people who supply the nurserymen gather them. It flowers in March and April, and the seeds are ripe in May.

Besides the common Elm, there are the witch hazel, or broad leaved Elm; the small leaved or English Elm, the smooth leaved or witch Elm, the Dutch Elm, the English Elm with beautiful striped leaves, the yellow leaved Elm, the Dutch Elm with striped leaves, the smooth narrow leaved Elm, the white barked Elm, and the French Elm. The three first, as well as the former Elm, are common in England, and so is the fourth, which is as hardy as the former. Those sorts with striped leaves are preserved by the curious, who collect variegated plants. The smooth narrow leaved Elm is common in some parts of Hertfordshire, and Cambridgeshire, and is a very handsome upright tree, which retains its leaves late in the autumn. They may be all propagated by layers or suckers taken from the roots of old trees; but the method by layers is best, because they come on faster than the others. The best soil for such a nursery is a fresh hazel loam, neither too light nor too dry, nor yet too moist and heavy.

With regard to the medicinal virtues, we are assured in the German Ephemerides of 1727, that several persons, afflicted with the dropsy ascites, have been cured by the decoction of Elm-bark, used as common drink for five or six weeks. There are sometimes on Elm leaves a sort of bladders, that swell to the bigness of a man's fist, which contain a liquor, in which are greenish insects. This must be strained through a cloth, and then several affirm it will be good for all recent wounds and bruises. Ray tells us, that the decoction of Elm-bark, reduced to the consistence of a syrup, and a third part of brandy added, is good to ease the hyp-gout, if used as a liniment.

UMBILICUS VENERIS, *Navel-wort*, has a tuberosse, fleshy, white root, furnished below with small fibres, which send forth round thick leaves, full of juice, that are tender, hollowed like a basin, and fixed to long pedicles, of a sea-green colour; from the middle of these there arises a slender stalk, about half a foot high, which is divided into several branches, covered with small flowers, consisting of a single leaf, expanded in a circular order, and cut into several segments; the colour is white, or a little inclining to purple, with ten stamina, and strait summits. These are succeeded by a fruit, composed of four hollow, umbilicated capsula, somewhat resembling a basket, in the middle of which is contained one seed, that is almost flat. This plant grows naturally among rocks, and on old walls, in stony hot countries, and flowers in April and May, at which time the leaves decay. It begins to appear towards the end of autumn, and keeps its leaves all the winter.

UMBILICUS VENERIS ALTER, *creeping Navel-wort*, has a long creeping root; but the leaves are much the same as those of the former, only they are greater, thicker, open towards the pedicle, crenated on the edges, and from among them there arises a round, firm, reddish stalk, furnished with smaller leaves, divided into several branches, loaded with yellow flowers, in the form of a spike. They each consist of a single leaf, cut into five parts, supported by a long greenish calyx; these are succeeded by five oblong, pointed, greenish capsula, full of very small reddish seeds. This plant grows wild in Portugal, and is cultivated in the gardens of the cu-

rious. It flowers in June, and the leaves are green all the winter, but then entirely disappear in May. The seeds of the former should be sown in autumn, soon after they are ripe, at which time they will come up very well; but if they are sowed in the spring, they seldom succeed. The leaves are said to be very good in external inflammations, and they may be substituted in the room of house-leek. Some bruise this herb between two stones, and apply it to ease the pain of the piles; but there are more certain remedies for these purposes.

UNEDO, *five* ARBUTUS, *the Strawberry tree*, has a pretty thick, woody root, from whence proceeds a shrub or small tree, whose trunk is covered with a rough chapped bark, and there are many reddish branches towards the top. The leaves are oblong, somewhat broad, and almost like those of the laurel tree, for they are thick, smooth, always green, and finely crenated on the edges. The flowers consist of a single leaf, cut into five parts, which are white, beautiful, disposed in bunches, and have an agreeable smell, with ten capillary stamina. These are succeeded by fruits, that have some resemblance to strawberries; but they are larger, of an orbicular shape, with the flesh yellow before they are ripe, and of a fine red when at maturity; it is divided into five cells, which contain several small, oblong, bony seeds. This shrub is very common in Italy, Spain, and the southern parts of France; it flowers in June and July, and the fruit does not grow ripe in less than a year. Blackbirds and thrushes are very fond of these strawberries, as well as women and children. There are some of these shrubs planted in England, and it is very common in Ireland, where the fruit is sold and eaten. With us it has an austere sour taste, which perhaps may be owing to the coldness of the climate, and therefore only the branches are brought to the markets, with bunches of flowers thereon, to be made up into nosegays. They may be propagated by sowing the seeds, which should be preserved in dry sand till March, at which time they may be sown on a moderate hot-bed, covering them with about a quarter of an inch of light earth, screening them from frost, or great rains. About the beginning of May the plants will appear, and then they must be weeded, watered frequently, and shaded in hot weather. In autumn they will be about five or six inches high. The bed must be hooped all over against winter, and should be covered with mats and straw, to keep out the frost. About the middle of April, they may be transplanted into small pots, which should be plunged into another moderate hot-bed, to encourage their taking root, and they should be shaded from the sun in the middle of the day. When they are between three and four feet high, they may be shaken out of the pots into the open ground, where they are to remain; this is best done in September, when the blossoms are beginning to appear, and then, if they be kept moist, they will take root very soon; but in November the roots should be well covered, to keep out the frost.

URTICA, *the Common Nettle*, has a slender, fibrous, creeping root, of a yellowish colour, with stalks that rise to the height of three feet, which are square, furrowed, stiff, covered with a stinging hair, hollow, branched, and furnished with leaves, placed opposite to each other by pairs; these are oblong, broad, pointed, dentated on the edges, and full of small stinging prickles. The flowers grow on the tops of the stalks and branches, under the leaves, and are each composed of several stamina placed in a calyx, with four leaves of the colour of grass; but they leave no seeds behind them; for this reason, they are distinguished into male and female. The male does not flower at all, but form pointed capsula, that sting when they are touched, and each of these con-

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tain an oval, flattish, shining seed. The female bears nothing but flowers without any fruit, according to the vulgar distinction; for the botanists call those male flowers that produce no seeds, and those female flowers that are succeeded by seeds. This plant grows almost every where, in great plenty; it flowers in June, and the seed is ripe in August. The leaves decay every winter, but the roots continue, and send forth fresh leaves in the spring.

URTICA MINOR, the *lesser stinging Nettle*, has a single, pretty large, white root, furnished with small fibres: the stalks are from half a foot to a foot in height, and are pretty thick, square, hard, furrowed, branched; and stinging, but not so strait as the former; the leaves are placed opposite to each other by pairs, and are more short and blunt than those of the common nettle; they are also deeply dentated on the edge, and sting greatly when touched. The flowers consist of stamina, disposed into small bunches, in the form of a cross, and of a grass green colour. Some of these are male, and others female, as in the former. These grow commonly by the sides of houses, and among the ruins of old buildings; both root and branches perish every year, and they are renewed by the seeds in the spring.

URTICA ROMANA, *Roman Nettle*, has a fibrous, yellowish, annual root, that sends forth a stalk to the height of four or five feet, which is round, branched, and furnished with stiff, stinging prickles. The leaves are placed opposite to each other, and are broad, pointed, deeply dentated on the edges, and are covered with a rough stinging, shining hair. The flowers are like those of the former, and are succeeded by small globes of the size of a pea, all rough with prickles, and composed of several capsulæ, that open into two parts, and have each an oval, pointed, flattish, smooth, slippery seed. It grows as well in cold as hot countries, in hedges, meadows, and among coppices. It is not so common as the two former, for which reason there are some that sow the seed in gardens; it flowers in summer, and the seed is ripe in July and August. Some call this the pill-bearing stinging nettle, with seeds like flax. These may be sown at the latter end of March, upon a bed of light rich earth; and when the plants are come up, they should be removed into beds on the borders of the pleasure garden, among other plants; because it is common for persons to gather sprigs of several sorts to smell to, and consequently this among the rest, and this is designed to sting them for the sake of mirth. The juice of nettles is recommended to stop spitting of blood, and other hemorrhages, and the dose is from two ounces to four. Some would have the infusion of the leaves of nettles, made like tea, to be given in the gout, the rheumatism, the stone, and gravel. It is common in many places to make pottage with the young shoots of nettles in the spring, to cleanse the blood. The roots of nettles made into a decoction, are said to be a good remedy against the jaundice, and to promote expectoration in an old cough, as well as in the asthma and pleurisy.

VULNERARIA RUSTICA, *Kidney-Vetch*, or *Ladies Finger*, has a single, long, strait, blackish root, with stalks that arise to the height of a foot, which are slender, round, downy, a little reddish, and lie upon the ground. The leaves are placed by pairs along one side, and are terminated with a single leaf like those of Goats Rue, but a little softer; they are hairy underneath, inclining to white, but of a yellowish green above, with a

sweetish acrid taste. Those which sustain the flowers on the tops of the branches, are broader than the rest. The flowers grow on the tops of the branches, and are yellow, papilionaceous, and have each a calyx like a tube, which are succeeded by short pods filled with roundish seeds, that are contained in a membranous bladder, and was before the cup of the flower. It grows in mountainous, dry, sandy places, or on chalky grounds in divers parts of England. It flowers in May, and June, and the seed is ripe in July and August. It has been accounted good for healing fresh wounds, but it is now out of use.

UVULARIA MAJOR, *Throat-wort*, has a thick, long, branched, white root, that sends forth several branches, to the height of three feet, which are sometimes as thick as a man's little finger, and are angular, furrowed, hollow, reddish and hairy. The leaves are disposed alternately along the branches, and are like those of the common nettle, but they are more pointed, and those below have long pedicles. The flowers are made like a bell, cut on their edges into five parts, and are of a blue or violet colour; but sometimes they are white, hairy within, and supported by a small calyx, cut likewise into five parts, and they have five short capillary stamina in the middle, with flat summits. The calyx is succeeded by a membranous, roundish, angular fruit, which is divided into several cells, with holes on their sides, and contain small, shining, reddish seeds. This plant grows frequently in woods, hedges, meadows, and in shady places; it flowers in summer, and the seed is ripe in autumn. Some cultivate it in gardens for the sake of the variety of the flowers. They are only propagated by parting the roots, for they do not produce seeds in England; the best season for removing them is about Michaelmas, when the roots may be separated and planted on the borders of the flower garden. This plant is astringent, deterfive, and vulnerary, and the decoction of it has been made use of against inflammations of the mouth and throat; but it must be only exhibited in the beginning of the disorder.

XYRIS, *five IRIS FOETIDA*, *stinking Gladden*, or *Flag*, has a round root, pretty much like an onion while it is young. But afterwards it grows crooked, knotted, and is furnished with pretty thick fibres; it sends forth many roots a foot and half or two feet in length, that are more narrow than the common Iris, and as sharp as the end of a sword; they are of a blackish shining green, and have a stinking smell like bugs. Among these leaves several strait smooth stalks arise, on the top of each of which there is a flower like that of the Iris, but smaller, and composed of six petals or leaves of a dirty purple, inclining to blue. These are succeeded by oblong angular fruit, which open like the male piony, and discover round seeds, as large as small peas, of a red colour, and of an acrid burning taste. It grows in moist places, on the sides of hedges, among bushes, and in shady valleys. It flowers in July and August, and the seed is ripe in autumn. It is cultivated in the gardens of the curious, and grows readily every where; however, it does not grow in many places spontaneously in England. The root and seed, taken in decoction, are said to be aperient, to purge off water, and to be good in the rheumatism and dropsy. A dose of the dried root, in powder, given in white wine, is a draehm. Some account it excellent in the king's-evil, and in the moist asthma; but its principal virtue is to purge off water, and to dissolve clammy humours.

OBSERVATIONS on HOT-BEDS,

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WATERING of PLANTS.

HAVING frequently recommended the use of Hot-beds, for the raising of particular Plants mentioned in the preceding part of the Natural History of Vegetables, it may not be improper here to consider that subject more at large, as well as to give the inexperienced some idea of the proper observations to be made previous to watering of plants. Without a perfect knowledge of these subjects, it will be in vain to attempt to rear any tender plant, or, indeed, to make any tolerable progress even in common gardening.

A hot-bed is the common help made use of by gardeners to forward the growth of a plant, and force vegetation, when the season of itself does not afford a sufficient warmth. By the help of this, if it be skilfully managed, the hottest climate of the world may be so nearly imitated, that the seeds of those plants, which are brought from any country, may be here made to vegetate and flourish in England.

In order to have a right understanding of the hot-bed, we must consider what degree of heat is required for the growth of the plant we intend to cultivate; for nature must be imitated as near as possible, and not forced or exceeded, if we hope for success in our undertaking.

Heat and moisture are certainly the rudiments of vegetation; and therefore, whoever would promote the growth of a plant, must contrive how to have them in such due proportion, as that neither one nor the other exceeds those limits, which nature has allotted for the growth of plants. A dry heat, we find from experience, rather scorches and shrinks a plant, than make it grow; and wet, if it is not quickly exhaled from the root of a plant, chills it, and often injures it past recovery. A moderate sweating heat, therefore, is most desirable, such as is raised by the ferment of wet straw or horse litter, which for a time will send forth, from the earth lying upon it, that gentle steam, impregnated with vegetative salts, which we find contributes so much to the growth of plants, besides putting those juices into motion, which are lodged in the root, and circulating them through the proper vessels.

The steam, which is supposed to rise from the root into the wood vessels of plants, to furnish them with sap, will indeed of itself keep a plant alive; but then, at the same time, the bark, leaves, and other spongy part of a plant, which encompass the sap vessels, if they are too dry, will shrink and pinch those vessels so very close, that they then cannot admit the sap to circulate through them in such quantity, as is necessary to support the plant in vigour: on the contrary, when the spongy parts of plants are kept moist by the ascending vapours, which continually rise round about them from the earth, then the sap vessels are also more open, and at liberty to receive the nourishment rising from the roots.

To explain this, let us consider those plants, which are cultivated in pots, and set singly in chambers, and other places of the house, for ornament in summer, though we allow them large pots, fresh earth, and water enough, as well as air, as much as they have in a green-house, yet they sensibly decline in a few days. This happens principally for want of that steam, which is always abroad, more or less, rising from the earth in the day, and condensing and falling upon them at night. Nor can the pots, set singly in a chamber, have this help, as those have, which are set together for shelter during the winter in a green-house; for the number of pots, in a collection of plants, afford steam enough to nourish one another, which one single pot cannot.

The like is to be observed in a dry season, when we are forced to water plants that stand abroad; they are by that help but just kept alive, because the earth round about them is so dry, that it hardly emits any steam, or at least not enough to support them. However, no sooner does the rain fall, than we find a contrary effect, as the vapours then rise from the earth every where about the plants, and make them flourish. Hence a hot-bed appears to be of use so long only as it can send out such vapours from the earth lying upon it, as are necessary for the support of the plants. When it wants the heat, which is required for that purpose, it must be renewed; otherwise the moisture, which must be maintained to nourish the roots of the plants growing in it, will chill and destroy them. We must not here be supposed to mean the steam, which arises from the dung itself, for that is known to be destructive to all plants; we mean the vapour only, which the heat of the dung evaporates from the earth lying upon it, and which will help the plants; but even this must be tempered and well qualified, lest it should scorch them. It may be moderated according to your desire, by laying on your earth of a thickness proportionable to the heat of the dung below it.

Having now considered the qualities required in a hot-bed, let us proceed to give proper directions for making it. Throw up a load of fresh horse-dung in a heap, mixing it well together, and then let it remain for a week or ten days, by which time it will ferment, and come to a proper heat. The bed then must be marked out, answerable to the size of your frames, the length of it running from east to west, so that it may face the sun. Some gardeners dig a trench a spit deep to make the beds in, and others save that trouble, and make it all above ground. The ingenious Mr. Bradley tried both ways, and found so little difference, that he could not say which was best. However, if the ground be wet and springy, it is best to make the bed quite above ground, otherwise the dung may be chilled. In the spreading of the dung, care must be

be taken to lay it equal in every part, that, when the bed comes to settle, it may not lie uneven; and, besides, that it may heat altogether.

Your bed being thus prepared, set on your frames, and put the earth you design for it upon the dung, laying it ridge-wise, that it may be more conveniently turned over, as you see occasion, if the bed should burn. When you find the extreme heat begin to abate, level the earth upon it, in order to sow your intended seed, always observing to have upon your bed the depth of six or eight inches of earth, to prevent the extreme heat of the dung from spoiling your crop; for, should the roots of whatever you sow or plant touch the dung, they will certainly be spoiled. To these directions should be added a careful observation of those, who make hot-beds; for theory and practice cannot be divided, and the one is indisputably necessary to gain a complete knowledge of the other.

As to the earth, proper to cover the dung of hot-beds, it should always be light, fresh, and well sifted; for you ought to consider how tender the roots of those plants will be, which you there intend to produce. The best composition for this purpose is sandy loam, mixed with an equal part of well-rotted horse dung; let these lie in a heap together, and be screened or sifted when wanted.

From these considerations on hot-beds, let us turn our attention to consider, what kind of water is the most proper to increase the health and vigour of plants. It has been found, from repeated experiments, that the clearest water is not to be preferred, nor such as comes immediately from a cold spring; neither should it be harsh, but rather soft and muddy. A stagnating water, that is well exposed to the sun, seems to be the best for the health of any plant. Pure rain-water, if it can be had without any mixture, is the best of all; for enriched or fattened water, becoming such from dungs or other forcing ingredient, proves always fatal to plants, if not rightly understood: at best, it can only contribute to make a plant grow something the quicker, and such forcing of nature always proves of ill consequence, as well to plants as animals, by shortening their lives.

Indeed, when annual plants are the objects of consideration, it may sometimes be of service to use these provocations, the better to bring them to perfection within the compass of our summer; but then they must be applied considerately, and a right kind of mixture prepared for each respective sort of plant; for we must not imagine, that one sort of mixture, however fattening it may be, will alike contribute to the welfare of every sort of plant. Mr. Bradley found by experience, that the black water, taken from a dunghill, will make a cabbage, or any of that race, prosper extremely; but having used the same water to other plants that were aromatic, and whose texture of parts was more close, such as myrtles, thyme, and the like, it soon killed them. This shews, that gardeners ought not to confide in the richness of any one particular kind of water for the welfare of every sort of plant, any more than a skilful physician will prescribe always the same medicine for the relief of every kind of complaint.

There is another thing to be considered in preparing water for plants, which as yet seems to be very little regarded; that is, when we mix pigeon's dung, or rather such like ingredients in water, we must allow them due time to ferment before we use them, otherwise they will injure the roots watered with them, and that will distemper the plants, which in the end may kill them, as we find from experience is frequently the case.

Mr. Evelyn very justly observes, speaking of these
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mixtures, that they should not be used till they are sufficiently sweetened and purged from their predominant acrimony. That gentleman saw many plants destroyed by the use of unripe mixtures, though the same preparations, when fully matured, performed wonders in forwarding the growth of the same kind of plants. The proportions of every ingredient ought to be reasonably considered, and the quantities not increased too hastily, merely because a moderate quantity has already begun to shew its good effects. However, a few observations, to an ingenious person, who loves a garden, will soon make him a proper judge of these matters.

Let us now return to plain water, which is undoubtedly the most natural to plants. Of this, use only such, if possible, that has stood in the sun some days to soften, either in cisterns, or pits dug in the ground, which last is preferred by Mr. Bradley; but even this should not be used inconsiderately: we should consider the most proper season for using it, and the best method of refreshing plants with it.

In the first place, we ought to water all plants in the morning, in such seasons when the nights are frosty, and in the evening in the warm seasons. The reason of the first is, that too much wet, lying about the roots of plants, chills and pinches them so much, if it happens to freeze, that they often perish; but, if it be given in the morning, where there is likelihood of a warm day, it gives the plant such nourishment as it requires from it, and is dried up before the frost of the evening can have power over it. Morning waterings should therefore be in August, September, and October, March, April, and the greatest part of May. From that time, to the middle of August, chuse the evenings for that work; because then the extreme heat of the sun would over-heat the water given in the morning to the plants, and scald their roots, besides drying it up too quick, before the plants could receive due nourishment from it. Observe never to use evening waterings after the sun is down, without great necessity.

In either of these waterings, care should be taken to do it as near the ground as possible, and not to hold the watering-pot too high; for that would wash the earth from about the roots of the plants, and contribute to make the ground hard, when the sun comes to shine upon it, and so bind the roots too much. Before you water, observe always, that the earth be open, and loose about the roots, and, above all, avoid, as much as can be, wetting the leaves; for, if the frost comes upon them before they are dry, it will pinch and rot them; and, if the sun shines hot upon them while they are wet, it will spot and change their colour.

Besides these simple waterings, cauliflowers, cucumbers, and those plants which have large vessels, should be floated; that is, the alleys between the rows should be dammed up at each end, and filled with water. One of these floatings will do more service than six waterings close to the stems; for they feed and nourish the extreme fibres, which alone want this help, and put the earth in such a condition, that the smallest warmth of the sun will evaporate that steam from it, which is so necessary to plump the principal parts of the leaves and stalks.

It is a rule to be observed in the watering of plants, that, while they are not growing, they should be kept as dry as possible; but, at the time of their growth, they should never want water, giving them frequently a little at a time, and chiefly when they are in blossom: for if, by accident of weather, the water lies long about the roots of plants, it chills them, and checks their growth. It is also to be observed, that such plants as are very succulent or juicy, such as house-leek, &c. must have little
5 E. water,

water, as they contain moisture enough in themselves for their nourishment, and feed chiefly upon the air, which they imbibe and condense in their spongy parts, as having fewer sap vessels than any other kind of plants. Mr. Bradley, in his History of Succulent Plants, lays it down as a rule, that the more succulent any plant is, the less water it requires; while those, that have the greatest proportion of sap vessels, and the least spongy parts, require frequent waterings, which we find to be true from common experience in the garden, and by examining the struc-

ture of water plants, such as willows, &c. which are for the most part composed of sap vessels, and are therefore so tough, that they may be wrought into any figure without breaking; but all juicy plants are brittle for want of these vessels.

In short, if we were to examine with the microscope the numbers and sizes of the sap vessels, in every sort of plant we intended to propagate, we might come to a certainty of the proportion of moisture every plant required.



A

NEW, COMPLETE, and UNIVERSAL BODY, or SYSTEM of
NATURAL HISTORY;

Being a Grand, Accurate and Extensive

Display of Animated Nature.

B O O K V.

Containing the Natural History of WATERS, EARTHS,
 FOSSILS, and MINERALS.

I N T R O D U C T I O N.

THOUGH the great Author of the universe has been pleased to cast a veil over many things, yet we are not to imagine, that he has for that reason forbid our enquiries into them. That veil is not always impenetrable: from whence we may infer, that there is implanted in our nature a thirst after knowledge; and, as we are surrounded with objects of admiration, though we are perfect strangers to their first principles and most secret causes, our gratitude is always increased, and our ideas enlarged, in proportion to the discovery we make of their structure, contrivance and grandeur.

It is to the Earth we are indebted for the conveyance of those particles of Water, which in particular places, by collecting themselves together, form springs and fountains. Let us pursue one of these springs, insignificant as it first appears, through its gradual progression and increase. It is at first nothing more than a vein of water, issuing from some hill upon a bed of sand or clay. The little stones that are dispersed around it are not sufficient to interrupt its current: it turns and winds, and murmurs as it rolls along. At last it clears its way, falls in a torrent down upon the plains, and swells by being united with some other streams. It hollows the ground by the rapidity of its fall, and throws up the earth on each side of it: it insensibly forces its way through every thing that obstructs its passage, and digs a bed or channel for itself. The overflowings of the adjacent ponds, the snow that melts and trickles down the hills, and the additional supplies of brooks and rills that fall into it, fortify and enrich it. Then it assumes a name, and steers its course along the sides of flowery meads, it takes a tour round the hills, and graces, as it turns and winds, the spacious plains. It becomes the general rendez-

vous of almost all kinds of living creatures: a thousand little party-coloured birds, of various notes, divert themselves upon its sandy banks, skim over its surface, and dip their wings in its refreshing streams. This is their favourite place all day, and, when the approach of night compels them to withdraw, they quit it with reluctance. Then the wild beasts enjoy it in their turn; but, at break of day, they leave the plains to man, and the free use of the river to the cattle. The numerous herds forsake their pastures twice a day to pay their usual visits to the streams, in which they quench their thirst, or seek some cool retreat. The river, in short, is as delightful to us as it is to them: for the most part, we reject the hills and woods, and fix our habitations on its banks. When it has enriched the fisherman with a profusion of its stores, and refreshed the farmer's thirsty plains; when it has adorned the pompous seats of the nobility, with the most delightful prospects, and made the country every where agreeable, it pays a visit to those large towns that are indebted to its friendly streams for all their wealth and commerce. It is probable, that the mighty waters of the Danube and the Volga of Europe, the Nile and the Niger of Africa, the Ganges and the Euphrates of Asia, and the Amazons river and Rio de la Plata of America, owe their first source to some such trifling springs.

It may not here be improper to inform the younger part of our readers, in what manner springs receive their supplies. Hills and mountains contribute not a little to that purpose: At the bottoms of such mountains, whose tops are for ever covered with snow, (and of this kind are the Alps and the Pyrenees) we find springs, for the most part, which begin to flow in May, but run no longer than September,

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the cause whereof may be easily accounted for. As soon as the sun has advanced so near to one of the tropics, as to be able by its genial rays to warm the tops of the mountains, the snow which covers them dissolves, insinuates itself through the pores of the earth, and sinks either absolutely down to the bottom of those hills, or at least into their bowels, where its progress being obstructed by beds of clay or stone, it gathers together in a body, and there forms a variety of fountains; but no sooner does the sun deny its benign influence, than the fountains cease to flow. However, as there are many springs, which are never dry, and which are far distant from any hills or mountains, let us enquire from whence these receive their inexhaustible supply of water: This is undoubtedly from the rains that fall, which insinuate themselves into the bowels of the earth. It is an universal complaint, that moles, worms, field-mice, and a thousand other vermicelli, or little insects, are very pernicious to the earth in hot seasons, by their grubbing it up, and digging an infinite number of little holes in it of various depths; but the injury they do that way is amply recompensed by those numberless inlets, which they open for the rain, at such times when we stand most in need of it: and those crevices or chasms, which gape, as it were, on the surface of the earth in times of excessive droughts, render the passage of the water to the inferior layers more easy and expeditious. Those particles of water, which thus fall in showers, insinuate themselves with ease through beds of sand and porous earth, till they are obstructed in their passage by more compact beds of clay or stone, on which they rest, and there form one large basin or reservoir. The earth is almost every where full of those veins of sand, through which the water is perpetually passing; and some of those veins, having undoubtedly a communication with particular rivers, may either empty their own superfluities therein, or receive a supply in dry seasons. It is probable, that many of those springs, which do not vary in their height with the seasons, may receive their supply from some such source. That spring water should be warmest in the severest weather, seems easily to be accounted for: it is well known, that the earth abounds with particles of a sulphureous nature, which in warm weather escape through its pores, and exhale in vapours; but this is prevented when the ground is frozen so hard, as to form one solid impenetrable mass. The fire, thus confined deep in its bosom, will consequently act with more force on every thing it meets with, and will naturally give a greater degree of heat to the water that passes through it.

Hence we may conclude that those things, which we often look upon with indifference, nay sometimes consider as prejudicial, are frequently of the greatest consequence and importance to us: the sea, though the saline particles it contains makes its waters very nauseous, is in reality the first spring which serves to quench our thirst; the wind, though we are very apt to complain of it, brings us our vapours from the sea; the lofty summits of the mountains, though considered by many as useless, help to settle and condense them; the holes, chasms, and crannies, which render the earth so hideous and deformed, serve as so many conduits to convey the waters to their proper stations; and the beds or layers, though sunk so much beneath our sight, are formed to retain them.

Let us now turn our attention from the watry element, and take a slight view of the different soils and moulds, which the Earth produces. In these we see ample provision made for the various plants and vegetables they nourish and support. Some trees, plants, and grains, dwindle and die in some soils, but thrive and flourish in others. If some de-

light in a warm, some in a cold soil, others do best in that which is lax, sandy, or clayish; some in a moist, others in dry places; still we find provision enough for all these purposes. Every country abounds with its proper trees and plants, and every vegetable flourishes and is gay somewhere or other about the globe. To this convenience, which the various soils of the earth are of to vegetables, we may add their great use and benefit to innumerable animals, to many kinds of quadrupeds, fowls, insects, and reptiles, who make in the earth their places of repose and rest, their retreat in winter, their security from their enemies, and their nests wherein to repose their young; some delighting in a lax and pervious mould, admitting them an easy passage, while others seek a more firm and solid earth, that will better secure them from injuries without. In one place we are provided with chalks, okers, and boles, of all sorts, for medicinal uses, and of all colours, proper for drawing the outlines or sketches of any designs we propose to accomplish, or for painting such objects as may contribute either to our profit or delight. In another, we have various kinds of marl, which is so justly admired by our masons for its incomparable chalk, and more particularly by our farmers, who look upon it as an inestimable treasure. In several parts of England, but particularly in the barren regions of the north, there are beds or strata of bituminous earth to be met with, commonly called either Sea or Scotch Coal. Thus Nature provides fuel for the inhabitants of those countries, whose climate requires a more powerful warmth than what is afforded them from the benign rays of the sun, and thus makes amends for the want of those blessings, which are bestowed on more southern countries. Exposed to the severity of the cold northern blasts, they stand more in need of what they dig out of the bowels of the earth, than of what we find on its surface. There, strangers to the delicacies of life, they are contented with humble necessities.

Mankind, in order to live with decency and pleasure, must be supplied with a vast variety of accommodations: for this purpose they are furnished with an infinite number of Fossils, which are intended by Providence as a treasure that should never be exhausted. These are carefully lodged in spacious repositories under our feet, where we may infallibly find them upon all emergencies. These useful materials do not lie buried in the centre of the earth, nor so deep in the bowels of it, as to be inaccessible; but are planted at a convenient distance from its surface, that the soil may produce its proper fruits, in due season, without interruption. By this wise direction of Nature, our habitations are richly furnished both within and without, and the same spot of ground produces for our service a kind of double harvest.

From these considerations on fossils, let us turn our attention to those immense beds of Stone, which lie buried in the earth. Had all those vast masses, which lie under ground, been lodged up and down on its surface, we should have been much embarrassed, and had but little room left for the erection of our houses: had they proved as hard in the quarry, as they grow afterwards, all the art of man could never have been able to dig or cut them; and had they continued in their original state of softness, when exposed to the open air, our houses would have never been secure. When the descendants of Noah were reduced to the necessity of dispersing into distant countries, in order to seek out commodious settlements for themselves and their families, they found every place over-run with woods, and inhabited by an infinite number of savage beasts. By the help of a few boughs, and the skins of such beasts as they killed in the chase, they erected at first a few huts or tents,

which

which served to shelter them from the injuries of the weather. As they were not, however, at that time; always safe and secure from the attacks of those devouring beasts, nor from the merciless insults of their more savage fellow-creatures, what a peculiar providence was it for them, who as yet lived in a restless uneasy state, to find under their feet, and at a moderate distance from the surface of the earth, such immense quantities of matter, that was soft enough to be cut and fashioned according to their pleasure, and yet so solid at the same time, when exposed to the open air, and disposed in a proper manner, as to secure them not only from the most outrageous storms, but from the insults of their private enemies; and, at last, to defend whole kingdoms from any hostile invasions! By this means, in process of time, both villages and cities arose out of the earth, and men attained to the art of lodging and cementing the most unwieldy stones in the closest manner; of building for themselves commodious habitations, impregnable fortresses, and magnificent palaces for the reception of their princes and rulers; and, in fine, those solemn and pompous temples, in which all the families then on earth met together at stated times, to pay their tribute of gratitude and worship to their common Parent, to visit one another without pride or respect of persons and to lay themselves under the most solemn engagements, inviolably to perform all those good offices one towards another, on which the welfare of an amicable society entirely depends. We shall not here enter into any enquires, how these immense stones are formed, since that matter is fully explained in its proper place; we shall only add, that besides these huge masses, which the earth provides us for building our habitations, there are others, though less in bulk, of infinitely more value, such as diamonds, rubies, carbuncles, and a thousand other precious gems, which adorn the insides of the most sumptuous palaces, and grace the diadems of sovereigns.

We come now to the last point of consideration, that of Metals, of which gold is undoubtedly the first that claims our attention. The preference, which we give to this above all other metals, is by no means the effect of prepossession or caprice: the superior regard we pay to it is grounded on its intrinsic and inherent merit. There is no metal so solid and compact, so weighty, or so capable of being refined to so great a degree of perfection: it is, beyond all contradiction, of the most beautiful colour, and comes nearest to the radiancy of fire: it is the most ductile and obedient to the workman's hands of all metals whatever, and never soils or besmears them, as others will. The least particle of it gives an additional grace to every thing it touches, and has one other excellent quality, which is that of its never rusting, nor will it lose any thing of its weight while refining in the fire. It is therefore not at all surprising, that mankind should unanimously agree to fix upon a metal of so pure, so solid, and durable a nature, in order to pay for and procure such various accommodations as they indispensably wanted. Before the discovery of this precious ore, trade and commerce were carried on by way of barter: wine, for instance, was exchanged for oil, corn for flax, and one commodity was mutually agreed to be accepted for another, as occasion required. This method, however, of negotiating business, was attended with a thousand inconveniencies: two contiguous nations or provinces might possibly be over-charged with the same commodity; or, supposing the products of their grounds to be different, yet it created abundance of trouble to make a just computation of their real and intrinsic worth, insomuch that it was no easy matter to adjust an equivalent in the wholesale trade, though practicable in the retail

way; and men were often obliged, with reluctance, to dispense with many things, for want of such accommodations, as were agreeable to those who were possessed of them. Now, gold being a metal of a pure, ductile, and incorruptible nature, was considered by them as the most agreeable and proper substance, of which to make a general standard, and the most commodious equivalent that could possibly be given in exchange for all the accommodations and conveniencies of life whatever. As this radiant ore was very scarce, they agreed, with one voice, that a small quantity of it should be deemed a sufficient compensation for a large portion of any other merchandize. They wisely considered, how great would be their advantages, to be enabled, by virtue of a small portion of such precious metal, (which is little or no incumbrance to a traveller, and which he can easily conceal from the eyes of those, who might otherwise be disposed to oppress him) to take a tour all round the habitable world, in order to furnish them with whatever conveniencies they might want, and to defray all their necessary expences, without the least dependency, incumbrance, or enquiry. This method of transacting business was found to be so expeditious and convenient, that, in process of time, the practice became universal. There was one little inconvenience, indeed, that at first attended it: every merchant was obliged to carry his scales and weights in his pocket, in order to know the intrinsic value of the gold he received; but an expedient was soon found out to save him the trouble, by making little thin pieces of gold, which afterwards introduced those of silver, with some known and public figure impressed thereon by the authority of government, to settle and determine their real value, that he, who delivered his goods, might be well assured, that he received so much gold or silver, of such a weight and standard, in return. As gold, however, was reserved on account of the great scarcity of it, to discharge and pay off large sums, with the utmost expedition, they had recourse to baser and more common metals for their daily disbursements and their retail business.

The obedience of this metal, under the hands of the gold-beater and wire-drawer, is not only surprising, but a perfect prodigy; and, if we were not eye-witnesses of it, we should never be prevailed on to think it practicable. By the art of the gold-beater, a piece of this metal, of only an inch square, and not thicker than paper, is hammered out into a thousand leaves, each of four inches square. The following operation, though equally common, is much more surprising. A gold wire-drawer takes an ingot or bar of silver, of a cylindrical form, two feet and eight inches in length, and two inches and nine-twelfths of an inch in circumference. Upon this he spreads as many leaves of beaten gold as weigh, in the whole, exactly half an ounce. He then drives the extremity of this cylinder with force through a round hole that is made in a steel plate, the entrance whereof is wider than the other end, which is called the eye. After this the ingot is passed through several holes successively that are one finer than another. Thus, by slow degrees, it is reduced to the thinness of a reed, a coarse thread, and at last, after having passed through upwards of an hundred and forty holes, acquires the minuteness of the finest hair. The most surprising part, however, of this operation is, that the half ounce of leaf gold, which first covered the ingot of silver, should, notwithstanding its former degree of fineness, grow gradually still finer and finer as it passes through the different wire holes, and cover the surface of the silver so very exactly, as that no part of it whatever should be seen: it appears, in short, one entire thread of gold. Thus half an ounce of gold may be made

to extend itself into a surface of about seventy-three leagues in length. Hence we may plainly perceive, that the internal nature of this metal, and, in all probability, that of all other substances whatsoever, is beyond human comprehension.

The uses of copper and tin, for domestic purposes, are well known to every one; and there is not a metal that can be mentioned, but what has some useful property: yet that very metal, which to all outward appearance is the meanest and least polished, which abounds most with alloy, is of a dark and gloomy hue, and the most liable to rust—yet that very metal, *iron*, is more beneficial and advantageous to us than all the rest. It has one particular quality, which alone is sufficient, in some measure, to give it the precedence to all others, and that is, it is more hard and tenacious, which renders it every way qualified for the most lasting purposes. By being thus able to resist the strongest efforts, it becomes the guardian, as it were, of our houses, and our most faithful trustee. By linking thus inseparably together the materials of which our habitations are composed, it secures our persons, not only from the injuries of the weather, but from the hands of merciless and violent men. To this metal we are indebted for the greatest part of our utensils, which are made use of, not only in navigation, husbandry, and clock-work, but in all other liberal and mechanical arts. Gold and silver, had we not iron implements to work and fit them for our several purposes, would be in a great measure useless. We are so much indebted to this particular metal, that our daily provisions could not be commodiously dressed, nor should we well know how to divide them for eating, without it. To sum up its superior excellency in a few words: all other metals, indeed, are useful; but this is absolutely necessary, and we can make no tolerable shift without it.

From all these considerations we may conclude, that we can neither look round about us, move one step upon the earth, or dig under our feet, without meeting with a profusion of those treasures, which Providence has provided either for our convenience or delight. The survey of Nature, therefore, when rightly pursued, is a kind of popular theology, where all human kind, even the illiterate, may learn those truths, the knowledge whereof is a concern of the utmost importance.

C H A P. I.

Of Medicated MINERAL WATERS.

AMONG Medicated Mineral Waters some are cold, and others hot; the former are called by physicians *ACIDULÆ*, that is, a little partaking of acid, because some of them have a subacid or vinous taste, especially when taken immediately from the spring. The hot springs are supposed by some to be owing to subterranean fires; because near those places where there are volcanoes they are most frequent; but others think they arise from the fermentation of the different particles of which they partake as they pass through different strata of the earth; as for instance, Iron and Sulphur. But, be this as it will, their virtues are not owing merely to the heat or cold, but to the principles of which they are composed; for which reason it will not be worthwhile to treat of them as such, but to take notice of their contents, to which their properties are owing. We shall therefore divide them only into four Classes: 1. Mineral Waters containing earthy Particles. 2. Waters impregnated with Salts. 3. Sulphureous Waters. And, 4. Waters impregnated with Metals.

1. There are mineral-Waters, which have imbibed earthy particles that have the properties of Soap, particularly the Soapy Water of Plombiers in France, which at the spring head is warm, and tastes a little fat or soapy, with a small degree of roughness. This is supposed to run through a strata of Fuller's earth: it is prescribed in disorders of the stomach, proceeding from acidities, as well as in spitting of blood, excessive bleedings, a consumption of the lungs, and many other disorders, for which they are either drank or used as a bath. A large quantity is to be drank in a morning upon an empty stomach, and some make use of it for common drink.

2. Waters that have imbibed Rock Salt are not very uncommon, but they are not as some imagine of the same nature as those in which common Salt is dissolved; because this latter is not a simple substance, but contains a mixture of Rock Salt and fixed Alcalious Salt, imbibed in the bowels of the Earth; and that which is made with Sea Water partakes of a Volatile Urinous Salt, which is the produce of the putrefaction of fish, sea plants, and other marine substances, together with Bitumen and various Minerals.

It is but lately that Sea Water has been thought of any internal use in medicine, or at least its properties have lain dormant for a great number of years, except for diseases of the skin, for which it has been ordered as a bath; it has been recommended in all disorders of that kind, from the itch to the leprosy, as well as pains in the limbs; and some have thought, and still think, that it is a specific against the bite of a mad dog. It is now prescribed inwardly in all obstructions of the glands, in whatever parts of the body, and the diseases arising therefrom, for which it is both drank, and used as a bath. It is also good against obstructions of the kidneys, when there is no inflammation, or the stone is not too large to pass; and likewise against recent obstructions of the liver, and consequently the yellow jaundice, when given with medicines proper for that disease. A person of twelve years of age may drink half a pint every morning, and an adult a pint.

The Waters of mineral springs, impregnated with Sal Gem, when given inwardly, open the body and promote urine; besides which they are drying, binding, and discutient, whence they are good in cachexies, and the dropsy.

Those Waters are said to be nitrous, which abound with a Salt like the *Natrum* of the ancients, which some have mistaken for Saltpetre; whereas it is a kind of Alcalious Salt. Those springs that abound with it, are good for dissolving thick clammy humours, for opening obstructions of the bowels, as well as in a decayed appetite. When used as a bath, they help to resolve swellings and obstructions of the nerves.

3. There are many mineral Waters that partake of Sulphur, which may be easily known by the smell, as also by the sediment that is left after it has been evaporated over the fire. These are commended in disorders of the breast, and foulnesses of the skin, whether drank, or used as a bath; as also in trembling of the limbs, contractions of the tendons, the rickets, and some kinds of palsies.

Our Bath Waters are thought chiefly to partake of Sulphur, mixed with an exalted Vitriolic Steel. They are good in all weaknesses and decays of the constitution, as well as for a debauched stomach. They likewise dissolve viscid and saline particles in the blood and humours, and sweeten the fluids in general. Hence they are good in dropsies and consumptions before they are too far gone; as also in catarrhs, cachexies, jaundice, scurvy, scorbutic rheumatisms, asthmas, and all diseases of the skin, as well

well as old pains and aches; nor are they less effectual in many women's disorders.

4. These in general partake of iron or steel, though there may be possibly some of other kinds which have not been taken notice of by naturalists. There are many of these in Hungary, Germany, France, and other parts of the world, but the Pyramont and Spa Waters are the most famous we have from abroad; and in England we have the Tunbridge, Scarborough, Hampstead, and Islington. These in general dissolve gross humours, sweeten those that are salt and acid, and open obstructions. They are accounted good in all diseases of the head, whether they arise from the consent with the stomach, or not; they are also good in many diseases of the breast, particularly shortness of breath, coughs, and spitting of blood. In short, they are efficacious against all those distempers wherein iron or steel is of any use; and they must be much better, because the particles of the metal are become so volatile that they do not change the colour of the water; but then they are apt to fly off after they have been exposed to the air for a few days. Besides, as it is necessary to drink a pretty large quantity of these waters, the solution of gross thick humours is much better performed hereby, than by administering the metal in any other form.

CHAP. II.

OF MINERAL WATERS peculiar to ENGLAND.

HAVING taken a general survey of medicated Mineral Waters, in the preceding Chapter, we shall in this confine ourselves to those only, which are peculiar to England: We shall relate the chemical trials, which have been made to find out their virtues, and the good effects which they have been experienced to produce in the constitution.

It is usual to give an account of their contents, after the evaporation of the water; but this is not sufficient in all cases, because there is often a volatility, when just taken from the spring, wherein the principal strength of the water resides, and which is lost if not immediately drank. Hence it follows, that the nature of the contents will not always ascertain the virtues of the waters. However, in recounting the effects and properties of these waters, all the circumstances will be taken notice of, that may tend to give an insight into their operations; and that each spring may be more readily found, we shall place the counties in which they arise in an alphabetical order.

BERKSHIRE. In this county we meet with but two Mineral Waters, one at Sunning-hill in Windsor-Forest, which is of the same nature as the Tunbridge waters; and the other at Comner, or Cumer, three miles west of Oxford. This last water is always of a whitish colour, especially in the summer time when the well is low; the reason of which appearance is said to be owing to its proceeding from lime-stone. Oil of Tarter being dropt therein, causes it to let fall a white sediment; and Spirit of Hartshorn turns it to a pearl-colour; but with the Solution of Silver it turns to a purplish pearl-colour, and with Syrup of Violets, green. A gallon of this water will yield 296 grains of sediment, whereof 76 grains are lime-stone, and the remainder a calcarious nitre. The sediment is dark brown, with a saltish and very bitter taste; will ferment with Vinegar, as well as with Oil of Vitriol, and will turn green immediately with Syrup of Violets. The salt itself is of a yellowish brown, and has a saltish, nauseous, bitter taste. It is a kind of calcarious nitre, but inclines more to an alkali than

most others of this class. A quart of it will purge a robust country fellow.

CORNWALL. The mineral springs in this county have never been taken notice of till very lately, and that by Mr. Borlace, in his Survey of Cornwall. Madern Well is only a spring of pure water, which rises in the parish of Madern, four miles west of Penzance. However, it is resorted to by many people that are afflicted with pains, aches, and stiffness of the limbs; and it has done many cures, which may be only owing to the coldness and purity of the spring. Euny Well, once so famous, still preserves its reputation for drying up humours, and healing wounds and sores. However, as this has no evident mineral impregnation, these effects may be owing merely to the coldness of the water, which braces up the nerves and muscles, and strengthens the glands. Here is another well of this sort, called the Holy Well, which is about a mile and a half to the north-west of St. Cuthbert's church, in a cave that lies in a small sandy bay. In this cave, there are stones like icicles, that hang from the roof, and the floor of the rock is covered with the same substance. This water will not change the colour of green tea, nor curdle milk; from whence it is concluded, that it has neither alum nor steel in its composition. When this water is evaporated, it will deposit a small sediment, of the same colour and substance with the incrustations: it will neither melt nor flame, nor has it any particular taste or smell; and yet is in great use for fluxes and disorders of the bowels.

The most remarkable Chalybeate Spring in Cornwall rises in the tenement of Colurian, in the parish of Ludgvan. The bed through which this water runs is full of an ochreous, iron mineral, from which its taste and smell proceeds. It turns to a deep reddish purple with Galls, and with Oak-leaves it becomes of a bluish black, but has a purplish cast. When a thimbleful of Oil of Tarter was dropped into this water, it fell immediately to the bottom of the glass, which held about half a pint: but it precipitated no sediment, nor made any change in the water; only the colour was more inclinable to that of a bright oker, but was scarcely discernible. It will not turn silver black, and therefore it is concluded there is no sulphur in it; but in the morning, before the water is stirred, there is a film on the surface with all the colours of the rainbow, shooting to and fro, which occasions some to think, there is a naptha in the water. It will mix with milk, and lathers readily with soap; and after it has stood 24 hours in the open air, it undergoes no alteration from Galls, which is owing to the flying off of the volatile spirit. The virtues of this water are very great; for persons have been cured of the King's Evil, by drinking it, and washing the parts affected, whom Mr. Borlace knew; and he heard of many others that were cured in the same manner. It is very diuretic, promotes perspiration, opens obstructions of the bowels, and restores a lost appetite. It also cures sores of every kind, and is a very good eye-water.

CUMBERLAND. At Stanger in this county, two miles south of Cockermouth, and three west of Keswick, there is a spring of clear saltish water, with the taste and smell of iron; it turns white with Spirit of Hartshorn, and lets fall a great sediment with Oil of Tartar: a gallon of this water will yield 1170 grains of sediment, whereof 1080 are sea-salt, and the rest lime-stone. It is white, hot on the tongue, and grows very moist in a damp air. There is a little mixture of nitre with the sea-salt, but this last predominates, and is joined to a considerable quantity of iron. Four or five pints will purge upwards and downwards; but it is an excellent remedy in surfeits, pains in the stomach and breast, the green-

green-sickness, scurvy, sores, and breaking out of the skin.

DERBYSHIRE. Buxton Well lies at the bottom of a dirty village of the same name, and there is a large commodious house, to which much good company resort in the summer time. The water is neither so hot as that of Bath, nor so cold as that of Bristol. It has a sweet, pleasant taste, and a gallon will yield about 20 grains of a sediment, which consists chiefly of lime-stone, sea-salt, and a little calcarious nitre. It deposits a white sediment with Oil of Tartar; but it will not turn silver black, nor does it discover any signs of sulphur. It will not ferment with Spirit of Vitriol, nor turn green with Galls, till they have soaked four days therein. It is a temperate bath, and a very light water. It is of a relaxing, diluting, sweetening and attenuating nature, and will open obstructions of the smallest vessels. It is good in consumptions, for hot scorbutic humours, and all fluxions and bleedings, as well as in hypocondriacal and hysterical cases. It is of great use in the regular gout, in rheumatic and scorbutic pains, in vomiting of blood, and in all kinds of fluxes. It is good in internal inflammations, consumptions, the diabetes, and a bloody urine; as also in a bilious cholic, want of appetite, and in cold stomachs from hard drinking. To these may be added, contractions, cramps, convulsions, St. Anthony's fire, and all breakings out of the skin.

Matlock Bath is also in Derbyshire, near Warkworth, and ten miles north by west of Derby. The village is seated on the very edge of the river Derwent, is a very beautiful place, and is frequented by very polite company. The water of the bath is not so hot as that of Bristol, and it curdles with soap. It deposits a white sediment with Oil of Tartar, and the same experiments give the same appearances as in Buxton water. A gallon of water yields 40 grains of sediment, whereof 13 are salt, consisting of nitre and sea-salt; and the remainder is a rough, white, alkaline earth. The virtues of these waters are nearly the same as those of Buxton and Bristol, used either internally or externally. Both drinking and bathing are generally thought good for the cancer and the king's evil. Bathing is proper for rheumatisms, scurvy, and defecations of the skin. It is also used successfully in all sorts of bleedings, as well as hectic fevers and inward ulcers, with a milk diet. It also cures the diabetes, and the bilious cholic.

Westwood is another village in this county, near Tanderley, where there is a spring, which seems to be a solution of the pyrites, that generally attends pit-coal. It turns blue with Galls, and the salt separated from the earthy part of the sediment will shoot into beautiful crystals of vitriol, without any other salt. The water will cure stubborn ulcers, and particularly healed one in a maid-servant that was very frightful: it was washed twice a day with this water, and was cured in three months.

DORSETSHIRE has only one mineral water hitherto taken notice of, and this is at Nottinton, a village near Weymouth. The water has a strong sulphureous smell, with a flavour resembling that of boiled eggs, and the colour in a tin vessel is blue. At the fountain head a shilling put into this water, becomes of a gold colour in two or three minutes; and from various experiments it appears to be impregnated with sulphur and natron. It is remarkable for curing foulnesses of the skin, by internal use.

DURHAM. Hartlepool is a market-town in this Bishopric, 15 miles south-west of Durham. The water found here is a chalybeate, though as it rises it discovers a little steel and sulphur, which soon flies off after it is taken up. It lets fall a white sediment with Salt of Tartar, becomes whitish with

Spirit of Hartshorn, and turns of a pink-colour with Galls; but green with Syrup of Violets. A gallon yields 120 grains of sediment, whereof two parts are nitre, one sea-salt, and the rest lime-stone. The water is an excellent antiscorbutic, and cures habitual cholics. It is good in pains of the stomach, in indigestion, in the gravel, in women's obstructions, in hypocondriac melancholy, in the cachexy, in weaknesses of the back, hectic heats, and recent ulcers.

ESSEX. Here are several mineral waters in this county, of which one is at Upminster, seven miles south of Burntwood, and eight east of Barking. The water is bitter, and will curdle with Oil of Tartar, but more strongly with Spirit of Hartshorn, and will not lather with Soap. A solution of Alum causes it to let fall a large grumous sediment, and the solution of Copperas changes it to a dark dun colour. It appears to be a sulphureous water, of a considerable strength, and a gallon will yield 332 grains of sediment, which is of a nauseous bitter taste. It is chiefly a calcarious nitre, mixed with a little natron and sea-salt. The water is purgative and diuretic, absorbs acidities, strengthens the stomach, and checks vomiting.

Witham Water, when fresh, is perfectly clear, and has a very strong chalybeate smell and taste. It has a remarkable freshness when just taken from the spring, which renders it agreeable to the taste and stomach; but, after it had stood awhile, it loses that quality, and deposits a brownish sediment. A gallon, by evaporation, will yield 30 grains of sediment, which will grow damp in a moist air. However, this water is of no use, unless it be drank immediately at the spring, and then it is diuretic, and is good in hectic fevers, lowness of spirits, weakness of the nerves, and want of appetite. Witham is a market-town, which lies in the road between Chelmsford and Colchester.

Tilbury is a village, seated over-against Gravesend in Kent; the water here is somewhat of a straw-colour, and has a soft smooth taste. With Oil of Tartar, it will cause no immediate precipitation, though it will curdle with Soap, but not with Milk. A gallon will yield 180 grains of sediment, of a yellowish brown colour, with a sharp taste, like that of a fixed alkali. A quart of this is a middling dose; it generally passes off by urine and perspiration. It warms the blood, is good in lowness of spirits, and is a specific in loosenesses. It also cures almost all fluxes of blood, and is particularly good in an acidity of the stomach, and for some kinds of scurvies.

FLINTSHIRE is in North Wales, and Caergile, in this county, is about seven or eight miles south by west of Chester. The water found here is as clear as crystal, and yet it will turn whitish with Oil of Tartar; it also turns green with Syrup of Violets, and red with Logwood. A gallon will yield 220 grains of sediment, of which 66 are earth, and 154 are sea-salt and lime-stone. It appears to be impregnated with calcarious nitre and sea-salt, and, if drank to a quart or two, will purge pretty well. It has cured a woman that had a loathsome scurf all over her body, by drinking three pints of this water in a day. Likewise several children afflicted with scorbutic disorders, and the leprosy, have been cured by drinking and washing.

GLOUCESTERSHIRE has but one remarkable water, which is at Cheltenham, a town which lies in the road from Gloucester to Warwick. It was not much taken notice of before the year 1740, and then it was said to be the best purging water in England; but it begins now to be neglected. It is limpid, a little brackish, and nauseously bitter. It will curdle with Soap, and lets fall a white, grumous sediment with the solution of Salt of Tartar, and

and with the Spirit of Sal Ammoniac. It will ferment with Oil of Vitriol, Spirit of Salt, and Vinegar: beef and mutton boiled therein will become of a pale red, and it turns a deep green with Syrup of Violets. A gallon will yield 688 grains of sediment, which contains a little impalpable earth, mixed with a little salt, which is chiefly calcarious, and has a nauseous bitter taste. The dose is from one pint to three or four, nor is it ever attended with gripes, but creates a keen appetite. It has been used with success in the gravel, and will cure old scorbutic humours, St. Anthony's fire, and strumous inflammations of the eyes.

GLAMORGANSHIRE is in North Wales, and at Swansea, a sea-port town, there is a spring that has an acid stiptic taste like alum, though the predominant salt is a martial vitriol. It turns blue with Vinegar, and will not curdle with Milk. A gallon of this water yields 40 grains of sediment, of a highly acid, stiptic, vitriolic taste, and a light brown colour, which will ferment with Spirit of Hartshorn and Oil of Tartar. It is good in loosenesses, and will stop the bleeding of external wounds.

HERTFORDSHIRE has two medicinal springs, at Barnet and Northall. The first is called East Barnet, and is situated two miles south-east of High Barnet. Northall lies three miles north of High Barnet, and receives its name from Northaw, which is the same as North-grove, there having been a wood here belonging to the monastery of St. Alban. Both the waters seem to be of the same nature; that at Northall is a little brackish and bitterish in the throat; but is not so nauseous as that at Epsom. Barnet water is bitterer than the former, but they will both curdle with Soap, and let fall a grumous sediment with Oil of Tartar. With a solution of Alum they will let fall white grumes, which experiment shows they are not aluminous; but with Galls they turn of a wheyish colour, and with Logwood of a deep red. A gallon of Northall water will yield four drachms and twelve grains of very white sediment; and a gallon of that at Barnet, 20 grains of a brackish, bitter sediment. From other experiments it appears, that both these waters contain calcarious nitre, with a small mixture of sea-salt, and a little lime-stone. They have both a purging quality; but they are not half so strong as that at Epsom.

KENT has a remarkable mineral water, commonly known by the name of Tunbridge Wells, which is 34 miles south-east of London. In a warm season a gas of vitriol may be perfectly distinguished in this water; and it is generally allowed to be impregnated with volatile and spirituous exhalations. It turns of a blackish purple colour at the fountain-head with Galls, Oak-leaves, and Green Tea; but if a few drops of Spirit of Vitriol be added thereto, it will become clear again. In a rainy season in January, a gallon will yield nine grains of sediment; but in August no more than six grains. It is a light, and comparative pure chalybeate, and its virtues are most powerful at the fountain-head. It causes a blackish perspiration, which in time will change the linen of the drinkers to the same colour. It purges most by stool and urine; but if the stomach be foul, by vomit. In general, it is an effectual remedy in obstructions of the glands of the mesentery, as well as in recent dropsies, as also in phlegmatic patients, whose blood is very poor. It is good in all pains, and swellings at the pit of the stomach, though of many months standing. It is excellent in ulcers of the kidneys and bladder, and cures the cholic, vomiting, and the hiccough; it likewise kills worms. It strengthens the brain and nerves, and is good in convulsions, the head-ach, and vertigo; besides, it cures long and tedious agues, and is good in the

dropsy, black and yellow jaundice, hard swellings of the spleen, the scurvy, and green-sickness, as well as helps sore eyes and red pimples.

Sydenham Wells are in the parish of Lewisham, and are seated upon a common near Dulwich in Surry. The water is a little bitterish, will curdle with Soap, and, with the solution of Pot-ashes, it will let fall a white grumous sediment. From these, and other experiments, it appears to be impregnated with a calcarious nitre and sea-salt, joined to a little natron and calcarious earth. A quart will yield above a drachm of a palish yellow sediment, with a nauseous, bitter taste; and the salt separated therefrom has the same taste, with a little brackishness. It produces much the same effects as Epsom water, though it is not half so strong.

Dulwich water has its name from rising in the hills nearly adjoining to that village in Surry; but in reality it is in the parish of Lewisham, in the county of Kent. The water is generally clear, has a brackish taste, with a little bitterness in the throat, and will curdle with Soap; but with Oil of Tartar it will let fall a white grumous sediment. A gallon will yield three drachms of sediment of a greyish colour, and a brackish taste, which will ferment greatly with Oil of Vitriol. This water is chiefly impregnated with sea-salt, calcarious nitre, and a little calcarious earth. It is a brisk purge, and will cure ulcers of every kind, by bathing therein, all defecations of the skin, and even leprosy itself. It is good in obstructions of the bowels, in the green-sickness, black and yellow jaundice, the cholic, gravel, piles, cachexy, scurvy, and removes difficulty and sharpness of urine, as well as strengthens the brain and nerves. The dose is three pints a day at first; but should be increased every day till it come to eight or nine pints.

LANCASHIRE has several mineral springs, among which is Carlton Water, so called from Carlton, a village ten miles south-west of Preston. This water is somewhat of a chalybeate, and when just taken up has a faint smell of sulphur. It will curdle with Soap and Milk, turns white with Oil of Tartar, has a pink sediment with Galls, and changes to a deep blue with Logwood. A gallon contains 236 grains of a white sediment, whereof one third part is earth. The sediment is of a brackish taste, and bitterish in the throat, and will ferment with acids. The salt is also brackish, very bitter in the throat, and emits an acid fume with Oil of Vitriol; but will not ferment nor change with Vinegar. It is a more powerful absorbent than many other nitrous waters, and three or four pints will purge briskly.

Rougham Water, so called from Rougham, a village in Lancashire, two or three miles from Cartmel. The spring rises from the bottom of a rocky mountain, and the taste of the water is a little brackish: it turns white with Oil of Vitriol, green with Syrup of Violets, and brown with Logwood; but it continues clear with Galls. A gallon of this water yields 300 grains of sediment, of a saltish taste, will ferment with Oil of Vitriol, and emit an acid fume. The water purges briskly by stool and urine, and the common people drink it from three to eight quarts. It is of great use in bad digestions, loss of appetite, and the scurvy. It has cured the jaundice and a quartan ague, and is excellent in the green sickness.

Crickle Spa rises in a village of that name, a mile from Broughton. It has a strong foetid smell, and will turn silver black in a minute. The earth it runs over is of a shining black, and yet it will turn rags, leaves, and grass, white. A gallon contains 320 grains of sediment, 12 of which are earth, and the rest are sea-salt and nitre. It is a purging, sulphureous water.

Heigh is a village not far from Wigan, where there is a water, which will ferment strongly with any alkali, will turn inky with Galls, and has likewise a vitriolic taste; a gallon yields four ounces of sediment, which consists of a variegation of white and green, with ochre, sulphur, and a little copper. It works plentifully by vomit and stool, and will stop any internal bleeding.

Burnly is a town also in Lancashire, whose waters will turn Galls of a deep red in a moment, and with Syrup of Violets to a very deep green. It works powerfully by urine, and is good in scorbutic cases.

Handbridge is seated between Burnly and Townly, which has a spring that changes Galls to a faint orange colour. The salt obtained therefrom yields a foetid, penetrating smell with salt of tartar. These two last Waters agree with the Pohun at Spa, in containing iron and natron as their principal ingredients. It purges by stool and urine, and is of great use in the gravel, scurvy, obstructions, and diseases from an acid.

At Ancliff, a village three miles from Wigan, there is a Spring called the Burning Well, which will take fire by holding a lighted candle near it. It will continue a whole day, and eggs and flesh may be boiled therein; but the water itself is cold. It is but a few yards distant from a rich coal mine, which renders it probable, that the inflammable vapour is rock oil.

There is a Spring two miles from Whaley, seven miles west of Burnly, whose stream renders Gold brighter; but turns all white metals black. The channel this water runs in is lined with a bituminous, stinking substance, and it is strongly impregnated with sulphur, combined with a little calcarious nitre, a mixture of sea-salt, and of absorbent earth; but we have no account of its virtues.

Inglewhite is a village in Lancashire, where there is a strong, sulphureous and chalybeate water, which is the product of marble. This partly resembles slate, will moulder, when exposed to the air, into exceeding thin flakes, like leaves of fine paper, and will afterwards turn to a black powder. A gallon contains 24 grains of sediment, of which 19 are earth and ochre, and 5 nitre; but it will not purge unless drank with salt.

LEICESTERSHIRE has one remarkable mineral Spring at Nevil Holt, a village seated to the south of Market Harborough: the water is exceeding fine and clear, and it has a styptic, bitter, sweetish and subacid taste, leaving the mouth somewhat dry. It is uncommonly brisk and sharp, when drank at the Spring-head; and then also it passes quicker than elsewhere: it curdles with Soap, and lets fall a gross, white sediment with oil of Tartar; but with a solution of Alum and Copperas, it will continue clear. Hence, and from other experiments, it appears to contain a calcarious nitre and alum, with a fat clay, a latent sulphur, and sometimes a little ochre. It will cure externally fresh wounds, and all sorts of ulcers; and is excellent for the eyes: used outwardly, and taken inwardly, it will cure hectic ulcers. When taken inwardly, as an alternative, an ounce or two may be taken five or six times a day, or four ounces night and morning; but when designed as a purge, it must be taken from one pint to three. If the constitution is cold and phlegmatick, it will be necessary to add four spoonfuls of brandy, and an ounce of sugar to each bottle of water. It is excellent in bloated, dropical constitutions: it has no parallel in all sorts of hæmorrhages, as well as in all great and natural secretions, of what kind soever. It also cures an inflammation of the lungs, attended with a cough and spitting of blood. It is very successful in the King's Evil, hidden cancers, as well as scrophulous inflammations of the eyes of many years standing. It also cures all dis-

eases of the skin, and has had surprizing success against rheumatisms; but it must not be drank in the increase and height of any internal inflammation.

LINCOLNSHIRE has several mineral springs, whereof one is at Cawthorp, a village seven miles north-east of Stamford, where the spring rises up in a large basin, in the middle of the street. It will turn very white with Oil of Tartar, and afterwards let fall a yellow sediment; but it will turn green with Spirit of Hartshorn. A pint will yield a scruple of a white sediment, whereof near one half is salt, and the other earth. It is a purging chalybeate, and is probably a great corrector of acidity.

In the parish of Strenfield, ten miles east of Lincoln, there is a water that is pleasant and sweet to the taste; but will curdle with Soap, and turns to a pearl colour with Oil of Tartar. A gallon of it contains four scruples of a white sediment, whereof 44 grains are earth, 30 nitre, and 8 sea-salt. It is found effectual in curing obstinate fluxes, and the diabetes; as also all internal hæmorrhages, and profuse night sweats.

Gainborough is a market-town in Lincolnshire, seated on the river Trent, 14 miles north-west of Lincoln. The spring rises to the south-east of the town, and smells and tastes like steel and sulphur. A gallon yields 192 grains of sediment, whereof 120 are earth, and 72 calcarious nitre: it has somewhat of a purgative quality.

MIDDLESEX contains several mineral waters, of which one is at Acton, a large village, eight miles west of London, which is a purging water, though it is very clear and without smell. The taste is a little nauseous, like a weak solution of Epsom salt: it will curdle with Soap, and with Salt of Tartar it produces a white grumous cloud. Oil of Vitriol and Spirit of Salt will excite a small fermentation, and with Syrup of Violets it will turn to a light green. A gallon will yield 344 grains of sediment; it is very white, and of a nauseous bitter taste; it will ferment very briskly with Spirit of Salt, and the proportion of the salt to the earthy matter is as 73 to 4: from other experiments it appears, that this water is chiefly impregnated with a calcarious nitre, and a small proportion of absorbent earth. It is accounted one of the strongest purging waters near London, and is noted for causing a great soreness in *Ano*.

Pancras lies on the north-west side of London, and in the road to Kentish-town; the water here has scarce any taste, till one half is evaporated, and then it becomes bitter; with Oil of Tartar it will deposit a copious white sediment; but with the solution of Alum there will be a small grumosity. Acid spirits will produce a small fermentation; and with Syrup of Violets it will turn green. A gallon will yield five drachms of whitish sediment, which has a saltish and strongly bitter taste in the throat: from hence it is concluded, that the impregnating salt is a calcarious nitre, and it is considerably diuretick, and somewhat purgative.

Shadwell Water is found in the Sun Tavern Fields, about two miles eastward of the Tower of London, and about half a mile from the river Thames. It is of an amber colour, with a strongly acid and styptic taste. It ferments for some time with Oil of Tartar, and lets fall a large ochreous sediment; but with the solution of Alum it continues clear. It will turn a copper half-penny black on the surface, and a knife black, blue, and rusty. A gallon contains 1320 grains of a white and yellowish sediment, which has a highly acid and austere taste. The predominant salt of this water is highly acid and vitriolic, with a combination of sulphur. This water has been chiefly used externally; but if a pint of it

be used at twice, in the space of an hour, it will produce a gentle vomiting, and two or three stools: it has done a great deal of good in all diseases of the skin; and some say it will cure fistulas, stubborn ulcers in the legs, and sore eyes, by dipping linen rags in the water, and applying them to the parts affected: taken inwardly, it stopped internal bleedings, and has perfected the recovery from camp dysenteries.

Hampstead is well known to be a large village, or rather town, five miles north of London; and the water that is found there was formerly in as great reputation, as that at Tunbridge. It will lather with Soap, but undergoes no alteration with Spirit of Hartshorn; and yet it will ferment with Oil of Vitriol, and grow warm and smoky. It will keep milk sweet for four days, and will turn purple with Syrup of Violets; likewise with half a grain of Galls grated, it will turn of a fine deep purple. A gallon will yield about five or six grains of a kind of saline concretion, mixed with a yellowish earth, that will taste somewhat like vitriol of steel. It works chiefly by urine, and has been found good in want of appetite and indigestion: it is also good in vomitings, cholicks, nervous, and hysterical disorders, raising the spirits greatly. It is serviceable in the fluor albus, in weakness from miscarriages, and in the scurvy and all diseases in the skin: it is proper in obstructions of the mesentery, bladder and skin; and also in some paralytic disorders.

New Tunbridge-Wells are near the New-River-Head, at the entrance of Islington, on the side next London. The water has the taste of iron, and is a little styptic, with some degree of quickness both in smell and taste, especially in the summer season. It will lather with Soap, and turn a little milky with a large proportion of Oil of Tartar; but it will not let fall any sediment with volatile alcalies. A gallon will yield from 10 to 30 grains of a reddish earth, which will ferment with Oil of Vitriol. It is a light and comparatively pure chalybeate, of considerable strength at the fountain head, where it ought to be drank. It is of great efficacy in all nervous disorders, and restores the strength after violent acute diseases: it opens all obstructions in women, and is excellent in a dropsy; in which case the dose is from half a pint to a pint, and no more. It opens obstructions of the glands, and is of some service in reducing corpulent habits.

NORFOLK has but one remarkable mineral Spring, which is at Thetford, a market town of great antiquity: the water appears to have somewhat of iron; for Galls will turn it first purple, and then black. It will let fall spontaneously a drachm of an earthy substance of the colour of ochre, which being calcined in a crucible, some of its particles may be attracted by a loadstone. From other experiments, it appeared to be impregnated with iron, sulphur and natron; it works gently by stool and urine, and sharpens the appetite: it restores lost strength, and cures pains of the stomach, and of the head, as well as fainting, vomiting, convulsions, and indigestions, difficulty of breathing, and the beginning of a consumption; it also kills worms.

NORTHAMPTONSHIRE has three mineral Springs, whereof one is at King's-cliff, eight miles south of Stamford, and it both smells and tastes of iron. It will let fall a white sediment with Oil of Tartar, and with Galls it precipitates a purple sediment; but turns of an opaque red with Logwood, and of a deep green with Syrup of Violets. A gallon yields 140 grains of sediment, 75 of which are loadstone and ochre, and 65 a calcarious nitre. From various experiments it appears, that this water is of a chalybeate, laxative nature, impregnated with iron and calcarious nitre, with a small quantity of sea-salt, and a calcarious earthy substance. It will not purge a strong person, unless he drinks from three

to five quarts; but it has been used with great success, in disorders from obstructions, and in eruptions of the skin; it has also cured several lame persons.

Astrop is a village in this county, four miles south-east from Banbury in Oxfordshire; and the mineral water here is a brisk, spirituous, clear and well-tasted chalybeate. It lets fall a white sediment with Oil of Tartar; and a gallon, after evaporation, yields 17 grains of sediment, containing nitre and calcarious earth. Drank at the fountain head, it is a certain cure for all female obstructions, and in the first and second stages of consumptions. It seldom fails in the jaundice and beginning of a dropsy, and restores a constitution weakened by hard drinking: the dose is very large, that is, from three quarts to five in the forenoon; and some affirm it will cure madness and melancholy.

In the parish of King's-Sutton four miles south by east of Banbury in Oxfordshire, there is a mineral Spring, that has an intolerable strong smell like rotten eggs; but the taste is saltish, warm and pungent, like Salt of Tartar. A gallon yields 166 grains of sediment, of which 9 are earthy, and the rest salt, of a pungent, brackish and bitter taste, with all the characteristics of an Alkali. It is a purging water, strongly impregnated with sulphur, and an alkaline salt mixed with sea-salt. It is famous for dissolving and healing of tumours, ulcers, and all diseases of the skin.

NOTTINGHAMSHIRE has a mineral Water at Kinalton, nine miles south-east of Nottingham. It is clear, pleasant, cooling, and a little saltish; it grows white and curdles with Oil of Tartar; but undergoes no alteration with acid spirits, and will turn of a beautiful light red with Tincture of Logwood. A gallon will yield 280 grains of a beautiful white sediment, the fourth part of which is a fine alkaline earth; and in the remainder is a remarkable pure, clear nitre. This is a purging water, that has not above half the portion of contents as Epsom water, nor will it work unless drank plentifully.

At Orston, 12 miles east of Nottingham, there is a mineral Water, which, as it rises out of the spring, has a sweetish chalybeate, and a little roughish taste; but, when it has stood for some time, it becomes rough and harsh. A gallon yields 128 grains of sediment, of which the portion of the earth to the salt is as 27 to 9. The Water is a rich chalybeate, with a considerable quantity of sulphur, if drank as it springs up; but the predominating salt is a calcarious nitre, mixed with a small quantity of sea-salt. It will purge those of a gross habit of body, and will turn the throat, tongue, and stools of the drinkers, perfectly black. It is good in the hypochondriac melancholy, scurvy, want of appetite, indigestion, pain of the stomach, costiveness and stoppage of urine. It is also good in the beginning of obstructions of the bowels, and likewise in ulcers of the lungs, and spitting of blood.

In OXFORDSHIRE is Chadlington Water, in a village of that name, three miles south of Chipping Norton. It smells like the washings of a foul gun, and a gallon yields 90 grains of sediment, of which 7 are earth, and the rest a peculiar sort of nitre. From other experiments it is found impregnated with sulphur, and an alkaline salt mixed with sea-salt: it is accounted a purging water.

Clifton is a village two miles east of Doddington, where there is a clear water that affords a sediment, which yields a peculiar kind of nitre, inclinable to an alkali. It is laxative, and is used to cure diseases of the skin in men and cattle, by bathing therein.

Doddington is a small market-town 16 miles north of Oxford, where there is a strong sulphureous water,

ter, that smells like the washings of a foul gun. A gallon yields 87 grains of sediment, whereof 44 are earth, and 43 salt. It is impregnated with sulphur and iron, both of which are very volatile; besides which, it has salt enough to give it a purgative quality.

RADNORSHIRE, in South Wales, has very remarkable mineral Waters at Llandridod, which is 24 miles west of Lempster in Herefordshire. Here there is a common six miles long and three quarters broad, and in that part of it lying in the above parish are the mineral Springs. These are the saline pump-water, the sulphureous water, and the chalybeate rock-water. The air is exceeding healthy, insomuch that weak and consumptive people, that come hère to drink the waters, soon revive and gather strength. These Springs are now frequented by very genteel company, and in the summer time the common people resort here in crowds.

The Rock-water is so called, because it issues out of a rock, and a glass of it taken up in a clear warm day, is as bright as crystal; but after it has stood some time, it changes to a pearl colour. While it continues clear it has a strong chalybeate taste and smell, but they forsake it as it changes colour: at the spring head, it turns to a deep purple with powder of Galls, and becomes hot with Oil of Vitriol. However, it will not curdle Milk; but with Oil of Tartar it becomes as white as milk, which afterwards changes to a yellowish green. It preserves its transparency with acid spirits; but with Sugar of Lead it turns first milk white, and at length lets fall a yellowish grey sediment, from a quart of water, which after it has been analysed, is found to contain about 15 grains of crocus of iron, and about 5 of the bituminous mucilage of iron. From hence, and various other experiments, it is concluded, that this water contains iron, salt, sulphur and vitriol. It is good in all chronick distempers proceeding from a laxity of the fibres, particularly in scorbutic eruptions and weakness of the nerves, and disorders proceeding from the brain. It is also efficacious in obstinate agues, obstructions of the bowels, slow nervous fevers, and in all female disorders.

The saline purging water is called upon the spot the Pump-water, and from various experiments it appears to contain a neutral salt like native borax, a small quantity of bitumen, and an ethereal, elastick, volatile mineral spirit, and a mineral oil. It is excellent in all diseases of the skin, and in such disorders as proceed from corrupt humours: but if the disease is obstinate, it requires some time to cure it radically. Persons troubled with the scurvy, must use the water both as a purgative and alterative; and, for the last, a pint and a half should be taken at three doses, in the morning before breakfast. As a purge, half a pint must be drank at a time, till it begins to work. In diseases of the skin the patient must bathe frequently, and wash the parts affected with the water, and particularly in the leprosy, so much water must be drank, as to cause two or three motions every day; to which must be joined bathing twice a week in a warm bath, made with equal quantities of the pump and sulphureous waters. In the gravel, the patient must drink so much as will give him two or three stools, and when the gravel is discharged by this means, the patient must drink every morning half a pint of the rock water, and half a pint of the pump-water; also half the quantity going to bed.

The Sulphureous Water, commonly called the Black stinking Water, has its name from the strong smell, and the blackness of the channel through which it passes. It smells like the washings of a foul gun, and has the strongest smell in rainy weather. From various experiments, it appears to con-

tain ethereal, volatile, mineral spirits, a small quantity of a vitriolic acid, a mineral, unctuous mucus, a fine mineral oil, a subtle crocus, a perfect sulphur, and a neutral salt, of a briny, calcarious nature. It is of great use in all cases, where bathing is proper, made into a luke-warm bath. It is excellent in benumbed limbs, in wasting of the flesh, and in nervous disorders; as also in old sores, tetters, and in all diseases of the skin; as well as in the stone, gravel, rheumatism, and gouty distempers. Drank inwardly, and used outwardly, it cures the King's Evil, and is an excellent absorbent, insomuch that it is efficacious in soreness of the stomach, obstructions of the liver, and in the jaundice: it is also good in contractions and weaknesses of the limbs, and in broken constitutions from hard drinking. The dose cannot be determined, and therefore it is best to begin with drinking from a pint to a quart in a morning, that is, about half a pint at a time, with short intervals between the draughts: the quantity may be increased to as much as the constitution will well bear, that is, as much as will sit easy on the stomach, and pass off well.

SOMERSETSHIRE is remarkable for having two of the most noted mineral Waters in the kingdom, those of Bristol and Bath, besides others of different kinds: that at Bristol issues out of a rock, and in that city is called the Hot-well Water. It is seated on the north side of the river Avon, where there is a romantic and beautiful prospect. When first drawn off, it is of a whitish colour, at least sometimes, which it loses gradually as it grows cold, and many small bubbles arise in it when taken from the pump. The taste is exceeding soft, pleasant and milky, at the spring head, and is very agreeable to the stomach; but it leaves a sort of stypticity on the palate. It is entirely without smell, and is only lukewarm to the touch. It keeps well in bottles that are properly stopped, losing only a part of the elastick air, which flies off before the corks can be put in.

With regard to chemical experiments, if a glass of water is poured upon a few grains of Sal Ammoniac, it immediately dissolves it, with a very sensible effervescence. Oil of Tartar not only produces the same effect, but renders the water milky, which after it has stood a-while goes off, and lets fall a light earthy precipitate. Dissolved Soap, dropped into a glass of water, immediately curdles, and in a short time the surface is covered with a greasy substance, and the water below becomes turbid. Twenty drops of the Solution of Silver, mixed with three ounces of the fresh water, in three hours made it appear as if a small quantity of ink had been dropped therein.

These, and other experiments, seem to declare there is some degree of an acid in the Bristol water, though not discoverable by the taste; there is also a small portion of sulphur, because when bottles filled with this water happen to be broken, it will stink very much. A gallon contains about 34 grains of sediment, which is of a light grey colour, of a brackish taste, and bitter in the throat. This will ferment with acids, and turn green, after some time, with Syrup of Violets. The salt is white, but will not ferment with distilled vinegar; and in the air it will grow damp.

Bristol water is generally allowed to be cooling, cleansing and balsamick, with a considerable degree of astringency, which renders it excellent in the diabetes: it will also open the urinary passages, obstructed by gravel. It is useful in many chronic diseases, that will not yield to a common course of medicine, and it is serviceable in many internal inflammations. It strengthens the stomach, promotes an appetite, assists digestion, and will cure the first stages of a consumption. It is good in disorders of

the eyes, and will cure ulcers therein, if taken warm from the pump, and applied with a soft rag: it has also cured many scrophulous ulcers, by washing them in this water, others say those of the cancerous kind, drinking the water at the same time: it has also been found successful in the bloody-flux, all internal ulcers, preternatural discharges, and bleedings of every kind.

The method of drinking the water, when the patient first comes down, is to go to the pump-room in the morning, and drink a glass or two before breakfast, as also about five in the afternoon; the next day the patient takes three glasses before breakfast, and three in the afternoon: and this course is continued during his stay at the Hot Wells.

Bath water, when viewed by itself in a small quantity, appears clear and transparent; but when beheld in the Bath, the face is of a sea-green colour. The smell is not very agreeable, especially in the Hot Bath; but when quite fresh it has a soft and milky taste. There are four Baths in this city, which differ from each other, chiefly in their degree of heat: namely, the Cross-Bath, the Hot-Bath, the King's-Bath, and the Queen's-Bath.

With regard to the experiments made with it, it is observable that when carried at a distance from Bath, it will precipitate Silver out of Spirit of Nitre into a hardish curd; but not so much as common salt: however, it is concluded from hence by some, that sea-salt predominates in Bath water. The King's-Bath, and Hot-Bath, will turn the solution of Silver white, with a bluish cast, which becomes gradually more dusk-coloured, and then deposits a dark grey sediment. The solution of English Vitriol, mixed with this water, turns to a pearl colour; that is, with the King's-Bath and Hot-Bath, and both will be covered with a thin variegated pellicle. With Oil of Vitriol, and other acids, the Bath waters will excite some intestine motion, and greatly blunt the acidity. If one part of boiling Milk be mixed with two parts of Bath water, a thin whey and curd will appear, if the water be just taken up. A drachm of Syrup of Violets will give a grass-green colour to an ounce of the King's-Bath water, as well as of the Hot-Bath in 24 hours time.

Some experiments shew there is a vitriolic principle in the Bath waters; for if they be taken fresh from the pump, in clear frosty weather, Galls will tinge them of a purple colour; but when cold, they scarce make any alteration at all. It is generally thought to be owing to the ferruginous principle of Bath water, that it will make better and blacker ink than common water. Likewise the sand of the Baths, exposed to the air for some time, will become vitriolic, and make ink with infusion of Galls. That there is an ochre in this water, appears from the yellow colour of the stones in the bottom of the Bath, and from the yellow matter like thin cream floating on the surface of the water, in the winter time.

From these and other experiments it is concluded, that there is a mixture of calcarious substance with the ochre; and the mud is found to consist of a bluish clay, with some testaceous particles; when it has been used as a cataplasm, it has somewhat of the smell of sulphur, and when rubbed on silver it changes it black. The sand, thrown on a red hot iron, emits a blue flame with a sulphureous smell, and being exposed to the air becomes vitriolic, as before observed.

A gallon of the Queen's-Bath water will yield 155 grains of sediment, the Hot-Bath 139, and the Cross-Bath 130. The quantity of a calcarious and argillaceous substance is double to that of the saline; the quantity of salt in each gallon scarce exceeds 43 grains, and the rest of the matter is a grit, with a blue sulphureous earth or marl. The gross remainder

emits a strong sulphureous smell, with a blue flame upon calcination, and by this operation a fourth part of the weight is lost, by burning away. The result of all the observations of different Physicians plainly shew, that the minerals in Bath water consist of a calcarious and marly earth and ochre, a marine or sea-salt, a little calcarious nitre, a glass of vitriol, a little bitumen, and a very small quantity of sulphur, which last can be made to appear no otherwise, than by consequences.

The Bath Physicians are agreed, that the Bath waters are useful in all diseases of the head and nerves, such as convulsions, palsies and epilepsies; in all diseases of the skin, obstructions of the bowels; in scirrhoties of the liver, spleen and mesentery; in most diseases of women, and in the scurvy and stone. The Bath waters are certainly a most powerful deobstruent, and their energy is so great, and their operation so sudden, that a very exact preparation of the body is required, and a stricter regimen than in drinking other waters. Likewise, a regard must be had to the habit of body, the season of the year, the symptoms of the disease, the changes of the weather, and the different degrees of heat in the several Baths. As for instance, the heat of the King's-Bath, without due precautions, is apt to inflame the blood, heat the bowels, and sometimes cause a fit of the gout. As to the manner of the operation of Bath waters, whether by bathing or drinking, or both, their effects are thus enumerated. Externally, they will heat, dry, attenuate, resolve and strengthen, and have a singular virtue in diseases from a cold and moist cause. They ease pains, disperse cold tumours, dry up moist ulcers, and are very advantageous in phlegmatic diseases. It is also remarkable, that nothing more effectually prevents too great a corpulency than the frequent use of these Baths. Bathing cures contractions and relaxations of the limbs, restoring lost sense and motion; but it is not proper in a fit of the gout, except in the decline of that distemper. It is also highly serviceable to those, whose sinews are impaired and crippled by the severe fits, and their frequent returns.

The Bath waters taken inwardly, to two or three quarts, commonly give two or three stools extraordinary; and it is remarked of the Hot-Bath, that it generally keeps the body open, while the King's-Bath has a contrary effect. When they are used as an alterative, they dilute, attenuate, sweeten, strengthen and heal, correcting the acrimony of the first passages, and curing the many disorders of those parts. They supply a want of spirits, and are good in diseases, where the secretions are diminished, as well as in all cachectic and scorbutic habits of body. They are very successful in hypochondriac disorders, and melancholy, as well as in disorders of the urinary passages, particularly sharpness of urine, the strangury, gravel, and ulcers of the bladder. The usual time of bathing and drinking these waters is generally five or six weeks, and, in obstinate cases, they must be repeated every year. The common quantity drank is from a pint to a quart and half a pint a day; but some have been allowed to drink a gallon every day, and then the patient must begin with small doses.

Alford is a village 24 miles south of Bath, and is remarkable for its mineral water, which has a nauseous bitter taste, and will curdle with soap, as well as yield a white grumous sediment with the solution of Pot-ashes. It turns of a dilute green with Syrup of Violets, and Galls will produce a greenish cloud on the surface, which descends deeper in two or three days. A gallon will yield six drachms of sediment, consisting of calcarious nitre and sea-salt, with a little lime-stone. It is cooling, cleansing, and penetrating, will attenuate gross humours, de-

stroy acrimony and temperate ebullitions of the blood; hence it is good in the scurvy, jaundice, and all sorts of obstructions. It cleanses the urinary passages, purges briskly, and promotes urine and sweat.

Lincomb Water is seated near Bath, and the water is by some called Lincomb Spa. When first taken up, it has a light, brisk, sulphureous smell, which it loses in six or eight minutes time; but its taste of iron is more lasting, that is, for the space of eight hours. It is transparent at first, but becomes bluish with standing, and throws up to the surface a thin, variegated unctuous scum. From various experiments it appears, that this water is impregnated with iron and a little sulphur, as also with bitumen, and a small quantity of alkaline salt. It passes off quickly by urine, mends the appetite, and raises the spirits. It is serviceable in disorders of the first passages, and is good in cachexies, the jaundice, and recent obstructions of the liver: it also deterges and heals ulcers of the kidneys, and removes the strangury. Outwardly, it cleanses and heals scrophulous ulcers, dries up sharp humours, and cures foulnesses of the skin.

Queen's-camel is a village five miles north of Sherborne, where there is a spring that proceeds from a hard rocky bank, and is called the Black-Well. It smells like the washings of a foul gun, and, from the trials made with it, appears to contain a considerable quantity of sulphur, some natron, and a calcarious earth. It cures, by bathing, scorbutic, leprous and scrophulous disorders; and it has been observed to cure dogs of the mange, by dipping them therein.

STAFFORDSHIRE has only three mineral waters, whose virtues are ascertained, one of which is at Codfall, a village 12 miles south-west of Stafford, that is in the wood adjoining thereto, which is a sulphureous spring, and the sulphur is mixed with salt, but not sufficient to restrain the volatility of the sulphur, so that in the winter, before rain, it may be smelled twenty yards off. It will lather with Soap, will not curdle Milk, and with Syrup of Violets will turn green; but neither Galls, Oak-leaves, nor a solution of Sublimated Tartar, would throw down the sulphur: however, Spirit of Urine did, and turned it of a faintish red. When leprosy was more frequent, this water was famous for curing them; but at present it is only used in scrophulous cases, and it operates both by stool and urine. They brew their beer with this water, and in Dr. Plot's time there was a house, called the Brimstone-Alehouse, where no one that lived there was troubled with diseases of the skin.

St. Erasmus's-Well is in the grounds belonging to the Lord Chetwynd, near Ingestre, two miles from Stafford. The water is clear, and of the colour of Sack, but has no remarkable taste, nor smell. A gallon of this water will yield 300 grains of sediment, whereof 272 are salt, and the rest moss. We are not told what diseases it is used for, nor indeed that it is used at all.

Willoughbridge is six miles north-east of Drayton in Shropshire, and in the park near it there is a well, whose water is as clear as crystal; but it renders the sides of the glasses, after they have been used awhile, a little oily, and of a bright yellow colour. If a few drops of a solution of Sublimate be let fall into this water, it presently becomes of a deep sack-colour, which seems to shew it has somewhat of a lixivial salt. It will lather with Soap, but will not curdle with Milk, nor change colour with Syrup of Violets. Contrary to most other waters, it leaves nothing behind it, after the evaporation of several gallons. Its oil or sulphur is so very volatile, that when distilled in a glass body and head, the Oil of Sulphur comes over the helm, upon the first heat, and is

always in the receiver, before the least drop of water appears. There is such plenty of this water, that at least 60 springs have been counted, that send forth plentiful streams. Dr. Plot informs us, that these waters have performed many wonderful cures, which he attributes to its balsamic virtue, and its great subtilty and volatility; and he farther adds, if we were to judge of the waters, from the many attested cures, it bids as fair for an universal medicine, as any thing else in the world.

SHROPSHIRE has a mineral water at Moreton, a village two miles west of Market Drayton, which will not lather with Soap, but curdles Milk, and yields a white sediment with Oil of Tartar; it turns green with Syrup of Violets, and scarlet with Logwood. A gallon of this water will yield 277 grains of sediment, whereof 76 are earth, and the rest a calcarious nitre. It is an excellent cooling diuretic and cathartic, and purges very briskly. It bears a great resemblance to Holt water, only the taste is more pungent, and consequently it is very likely to have the same virtues.

Pitchford is a village six miles south by east of Shrewsbury, which takes its name from the pitchy spring that is found there, on the top of which there floats a liquid bitumen, though it is skimmed off every day. It is found to be excellent for wounds, and will cure inveterate scrophulous ulcers.

Broseley is a village four miles north-east of Wenlock, and has a burning Well, which was discovered about the year 1711. A candle being put down into the well, it will take fire at the distance of a quarter of a yard, darting and flashing in a violent manner, to the height of 1820 inches. It is hotter than common fire, and boils any thing much sooner. It appears to be impregnated with a sort of liquid bitumen.

In SURRY there are several mineral waters, the most famous of which is at Epsom, a town about 15 miles south-west of London. The water is pretty clear and without smell; but if it be kept in covered vessels for some weeks in summer, it will stink, and acquire a nauseous bitter taste, with somewhat of a maukish saltiness. It will curdle with Soap and Salt of Tartar, and with Spirit of Sal Ammoniac it will let fall a grumous sediment; but if mixed with lime-water, it will continue clear. A gallon will yield an ounce, sometimes an ounce and a half, of a sort of cream and sediment, which is of a greyish colour, almost impalpable, of a brackish, nauseously bitter taste, and an odd strong flavour. There are about eight parts of salt to one of earth, the former of which is of a whitish yellow colour, and of a singular strong smell, with a nauseous bitter taste. All authors agree, that the crystals of this salt will require but a small proportion of water to dissolve them, for an equal weight has been found sufficient. The salt has a purging quality, for half an ounce, dissolved in spring water, will work like other physic. The water itself is a diluent, and a mild absorbent: it is also diuretic and cathartic. Poor people formerly used to wash old sores with the water, with a good effect. A dose of the water, in summer, is two thirds of a pint, and in the winter, half a pint.

Stoke is a village two miles south of Cobham, where there is a spring commonly called Jessop's-Well. This water is thought to contain more salt than any purging water in England, and it has a taste much like that of Epsom-Wells. A gallon of this water yields an ounce and a half, with 22 grains of sediment, that is, 742 grains in all. It is very white, and has somewhat of a brackish taste, with a nauseous bitterness. The earthy matter bears but a small proportion to the salt, which, as Dr. Hales informs us, will shoot into very bitter, irregular oblong crystals, some of which have re-

tained their former firmness, for five years at least. Half an ounce of distilled water will dissolve only 10 grains of salt, though standing by the fire-side, in which it greatly differs from that at Epsom. From the experiments made with it, it appears, that this water contains a large proportion of calcarious nitre, a little salt and calcarious earth, and very probably a little natron. A less quantity will suffice for a dose than of any other; for which reason it fits better on the stomach, and enlivens the spirits of those that drink it. It has been long noted as a good purging water; for a single quart will purge pretty briskly, and promote plenty of urine without gripes. It cures obstinate scorbutic cases; and, as some think, there is a fine volatile spirit in the water; it may be drank for a considerable time, as an alterative, with happy consequences.

Stretham is a village six miles south of London, that has been long remarkable for its medicinal spring. The water has somewhat of a yellowish tinge, and throws up a scum variegated with copper, blue and green colours. At the spring head it has a saline nauseous taste, and a gallon will yield 200 grains of sediment, the salt of which has a penetrating, brackish taste, with a strong flavour, and in the air it will almost melt. This is partly marine, and partly nitre, enveloped with a little sulphur, and a greater proportion of absorbent earth. When it was most in vogue, three pints boiled to a pint and a half were given as a purge; for it operates both by stool and urine, and it has been found good in disorders of the eyes.

The Dog-and-Duck is a noted public house in St. George's-Fields, in the parish of Lambeth near London. The water is clear, and has very little taste; but a gallon will yield 200 grains of sediment, of a dirty colour, and a pungent, brackish taste. The earthy matter is as one to twelve, in proportion to the salt, and it will ferment strongly with Spirit of Salt and Spirit of Vitriol; but will not turn to perfect lime by calcination. This water has been noted for curing leprous disorders; and some have affirmed, that it cured an ulcerated cancer in the breast by drinking the water, and keeping a cloth, wet therein, always over it. Being drank from one pint to three, it generally purges easily and briskly, without affecting the strength, unless in very tender constitutions. It may be taken as an alterative, instead of common drink, for the cure of scorbutic pimples, tetters, the leprosy, and the king's evil. It is also a palliative cure in cancerous disorders, and has been the means of prolonging the lives of several. The only fault of this water is, its being too cooling, for which reason it is prejudicial to persons of phlegmatic constitutions, and of weak habits of body.

Cobham is a town seated in the road between London and Guildford, and is seven miles south-west of Kingston. The water has a sensible taste of iron; and a gallon will yield seven grains of a substance like ochre, which a loadstone will attract, without calcination. It is a strong chalybeate, and deserves to be more known.

WARWICKSHIRE has two mineral springs, one of which is at Lemington, three miles south-west of Dunchurch, and is of a saline nature. A gallon yields 960 grains of sediment, 30 whereof are calcarious nitre, and the rest sea-salt. It is a strong purge and vomit, and is drank by labouring people from two quarts to three. It is noted for curing sore legs, and discharges of the skin.

Ilmington is a village seven miles south of Stratford upon Avon, and the water found here, though it has a brackish taste, is one of the strongest chalybeates in England. It sparkles at the spring head like bottled cyder; but it will not curdle with Milk, and yet Oil of Tartar will procure a small coagulum.

It will turn purple or black with Galls, according to the quantity; but with Syrup of Violets it changes to a green. A quart of water will yield near a spoonful of a reddish white powder, that will ferment and fume with acids. Those that drink this water have their stools tinged blackish, and though it generally operates by urine, it will sometimes purge. Internally, it is good in the scurvy, obstructions of the bowels, the jaundice, and beginning of the dropsy; it is also good in the strangury, and difficulty of making water.

WESTMORELAND has a mineral water at Kirkby-Thower, a village eight miles east of Penrith, which is a weak purging chalybeate. It is exceeding clear, sweetish, and has a little taste of tea. It grows whitish with alkalies, and turns to a clear purple with the Solution of Silver; but it becomes of a pink purple with Galls, a red purple with Logwood, and a deep green with Syrup of Violets. A gallon contains 190 grains of sediment, of which 140 are lime-stone, and 50 a calcarious nitre. The salt will not dissolve entirely in 48 times its own weight of distilled water; but it will turn of a pale green with Syrup of Violets. This water is a more powerful absorbent than any other of this kind, and it will purge well, if drank to the quantity of three or four quarts.

Shapinore is a marshy heath, lying between the mountains to the north of Shap. The water here seems to be of a sulphureous nature, for it has a strong foetid smell, and a sensible bitterness; but this soon goes off when it evaporates over the fire. It will curdle with Soap, and let fall a large white sediment, with the Solution of Pot-ashes. A gallon will yield 376 grains of a saline sediment, with a small proportion of very white earth. It is very white, and has a salt, pungent, bitter taste, growing moist when exposed to the air. This water has been casually found to work by stool and urine, and three pints have proved a very strong purge. It will cure inveterate piles, and is used by the common people to cure rheumatic pains in the joints, by rubbing it warm on the parts affected.

Wisherlake is a village seven miles south-west of Kendal, where the mineral spring has a saltish taste, and in summer smells a little like sulphur, throwing up a whitish scum. With Oil of Tartar it lets fall a pearl-coloured sediment, and with Galls it precipitates one that is purple. A gallon yields 547 grains of sediment, consisting chiefly of sea-salt and a calcarious earth, with a little mixture of a bitter, purging salt. From experiments made with it, it appears that it is chiefly impregnated with sea-salt, combined with a kind of calcarious nitre, a little iron, and a small quantity of sulphur. It has been found of great use in the stone, gravel, worms, want of appetite, the cachexy, jaundice and dropsy.

WILTSHIRE has a mineral spring at Chippenham, lately taken notice of, and was found in a garden near the river. At the spring head it has a brisk ferruginous taste, and turns of a claret colour with Galls. A gallon will yield 39 grains of a sediment of the colour of ochre, which has a very brackish taste. It contains a strong sea-salt, and a natron combined with iron. It has cured scorbutic disorders, besides others that are not particularly taken notice of.

West Ashton is a hamlet in the parish of Steeple-Ashton, four miles east of Trowbridge, which has a spring that yields plenty of water all the year round. It is clear, and will deposit a small quantity of sediment, after it has been kept several months in bottles. It will curdle with Soap, and lets fall a white grumous sediment with the Solution of Pot-ashes. A gallon will yield two drachms and two scruples of a whitish sediment, with a saline bitter taste

taste and warmth on the tongue. It is chiefly impregnated with sea-salt, nitre, and a little iron, with a small matter of sulphur. The water is best drank at the fountain head, and three pints is purging and diuretic.

Road is a village eight miles north of Bath, where there is a mineral Spring, whose water has a chalybeate and sulphureous taste and smell. A gallon will yield near a drachm of a yellow coloured sediment, that has a salt and pungent taste. The water appears to be impregnated with iron, sulphur, and a strong, native alkali or natron. It is a very gentle purge, and is good in scrophulous cases and diseases of the skin; it will also cure scorbutic ulcers.

Helt is six miles east of Bath, and is of note for its medicinal spring, first taken notice of in the year 1713. It will let fall a gross, grumous sediment with Oil of Tartar, and when mixed with Spirit of Sal Ammoniac, a white crusty substance adheres to the sides of the glass. It will not lather with Soap, but will ferment with Oil of Vitriol. With Syrup of Violets it will become greenish, and with Galls change to a green. Logwood turns it to a deep red, Brazil Wood to a scarlet, and Rhubarb to a pale amber colour. A gallon will yield 176 grains of very white sediment, which has a saltish, bitter taste, and will grow moist in a damp air; but the earthy part is nearly equal to the salt. This water principally contains a calcarious nitre, and the operation is more mild than other springs of this kind, on account of a large quantity of earthy matter contained therein. In small doses it is an alterative and diuretic; but two quarts will purge pretty briskly. It will dilute, cool, absorb and strengthen, and is used both externally and internally. Rags, or a sponge, dipped therein, will cure scrophulous ulcers, attended with carious bones; but then it must be taken inwardly at the same time. It will also cure inveterate running ulcers of the legs and other parts, and diseases of the skin, attended with great heat and corrosive humours. It is good for sore eyes, the piles, and ulcers of a cancerous nature, used outwardly and drank inwardly. It never fails of procuring an appetite, and will strengthen the relaxation of any part.

YORKSHIRE has several mineral Springs, of which the principal one is at Malton, otherwise called New Malton, that lies in the road from York to Scarborough. The spring lies at the west end of the town, and is so strongly impregnated with iron, that it is called the Malton Spa. Seven pints contain three drachms and a half of a reddish brown sediment, which has an austere bitterish taste, and a salt of a calcarious nitre, though different in some sense from others; for it will not ferment with Oil of Vitriol, nor Spirit of Salt; but it will turn greenish with Syrup of Violets. The mud and scum of this water will dry up and heal old ulcers, scabs and tetters to a wonder. Internally, the water works agreeably by stool and urine, unless the stomach be foul, and then it will vomit the first day or two. The common dose is from three pints to six; but some think smaller doses would be more proper. It is good in the hypochondriac melancholy, in an asthma with spitting of blood, and in internal ulcers and bleedings. It is also recommended in obstructions of the bowels, and in a relaxation, weakness, and languidness of the body, it being a strengthener and a deobstruent as well as a purge.

Croft is a village in the North-Riding of Yorkshire, on the confines of the bishoprick of Durham, where there is a spring of fine, clear, sparkling water, with a strong smell of sulphur. A gallon yields 177 grains of a very white sediment, which has a strong smell like that of hawthorn flowers. It consists of lime-stone, nitre, and sea-salt; but the nitre is double or treble to the latter. It is a purging wa-

ter, if drank from four pints to nine, and is said to have performed many eminent cures, both by drinking and bathing.

Harrowgate is two miles north-west of Knarefborough, in the West-Riding; it is supposed to be the strongest sulphureous water in Great Britain. A gallon of that commonly drank, for there are three wells, contains two ounces of pure sea-salt, and near two scruples of earth; therefore the predominating salt must needs be marine. A warm bath made with this water cures aches, bruises, strains, lameness, weakness of the back, beginning of the dropsy, and paralytic pains and weaknesses. It also dissolves hard swellings, cures old ulcers, and all diseases of the skin; it has also great power in easing the gout and sciatica. Internally, drank from three to four pints, it purges briskly, and raises the spirits. It powerfully cleanses the stomach and intestines, killing all sorts of worms; besides which it will cure the cold scurvy, and help the jaundice of many years standing. It also cures disorders of the spleen, the green sickness, cramp, the head-ach, and the king's evil.

Broughton water proceeds from a spring, in the road from Skipton in Yorkshire, to Coln in Lancashire, the village being in the mid-way between those two places. It is of a whitish colour, and colder than common water, as is observable in others of the sulphureous kind. A gallon contains four drachms of sediment, the fourth part of which is earth, and the rest sea-salt and nitre. The virtues are much the same as those of Harrowgate water, but weaker.

Wigglesworth is a village in the West-Riding, four miles south of Settle, where there is a spring remarkable for yielding an alkaline nitrous salt. It is very black, and has a strong smell of sulphur, with a saltish taste, and lathers with Soap; but will not curdle Milk. Three gallons yield seven drachms of sediment, of which six scruples and a half are black earth, and the rest salt. The country people drink four or five pints of this water as a vomit, and six or seven as a purge; but it seems strange that more should be required for the latter than the former.

Newton-dale is in the North-Riding, 12 miles west by north of Whitby. The water here is cold and very astringent; and it petrifies every thing in its course, producing various and beautiful incrustations and figures. It effectually cures loosenesses and bleedings of every kind, both in men and beast; and it quickly and wonderfully restores weakened joints, that are even beginning to be distorted, by bathing therein.

Knarefborough is noted for a dropping Well, so called, and is a market-town in the West-Riding. The water is very cold, extremely limpid and sweet, and it will let fall a white sediment with Oil of Tartar. It has a petrifying quality, and its particles consist chiefly of spar and some sulphur. A gallon of the water, that fell from the petrifying rock, yielded 185 grains of sediment, of which seven scruples and four grains left five scruples and four grains of earth, which would ferment with acids; and there were two scruples of salt, which shot into nitrous crystals. It cures inveterate fluxes of the belly, bloody fluxes, and the diabetes, as well as all preternatural discharges of blood; also colliquative sweats, as well as ulcers of the bowels, and hectic fevers. Three half pints are a dose.

Scarborough Water is the most noted in all Yorkshire, and was discovered about 160 years ago. It has been much used of late years, not only at the fountain head, but at distant places. The taste is bitterish and ferruginous; it curdles with Soap, and yields a large white grumous sediment with Oil of Tartar. A gallon yields about 284 grains of a reddish

dish white colour, with a bitter, saltish and roughish taste. It destroys the sourness of acids, ferments strongly therewith, and turns of a light green with Syrup of Violets. The proportion of earth to the saline parts is as 66 to 150. The water has been found good in hectic fevers, the rheumatism, scurvy, preternatural thirst, recent and partial inflammations, and diseases of the skin. It is also good in disorders of the stomach from intemperance, as well as in hypochondriac and hysteric disorders; in asthmas, in habitual costiveness, the heart-burn, and in all cases where purging is indicated.

CHAP. III.

OF EARTHS and CLAYS.

THAT sort of Earth, which we call SOIL, proceeds from the putrefaction of animal and vegetable substances, and will burn in the fire and swim in the water. Linnæus has nine sorts of these, whereof one does not properly belong to this class: the others are, the Marthy Soil interwoven with roots, and this is the same that we call Turf, which in many parts of England is used for such. The Vegetable Watery Soil is nothing else but Mud, and is to be met with every where in and about standing waters. The Spungy Soil of heaths will ferment with some sort of fluids, particularly acids. The Vegetable Soil of the Alps is to be met with every where among those mountains, and is a little reddish, or rather of a blackish brown. The Vegetable Common Black Soil is met with in various places, particularly in meadows, fields, and pastures. The Vegetable reddish Soil, partaking of Ochre, is particularly found in West Gothland. The Animal Soil of brute beasts may be met with in places where several of those animals have been laid in heaps, and have putrified and turned to Dust; that of human bodies may be seen in every church-yard.

A CLAY is a heavy, thick, fat, tenacious, smooth Earth, which when held in the mouth becomes like soap or suet; it is either soft or hard, in proportion to the quantity of Water that is mixed with it, for it readily dissolves in that fluid. When it is soft, it may easily be shaped into any form; but, when it is baked in the fire, it turns into a stony substance. There are a prodigious number of different sorts of Clay, and of different colours.

The Clay that is perfectly pure and white is of a very fine texture, and when cut, leaves a polished shining substance; when examined by a microscope, it appears to be of a close, even, regular texture, unless mixed with particles of a different kind. It will ferment pretty briskly with Aqua Fortis, as will most other kinds; for Linnæus makes it a characteristic of Clay. Whether we have here any of this sort is uncertain.

The CIMOLIAN EARTH of the shops is a sort of Fullers-earth, and is of a dull white colour, though the surface is tolerably smooth. When burnt in the fire, it becomes very white and hard, and in a violent fire will turn to a dirty sort of Glass. It is to be met with in several parts of England, particularly at Wednesbury in Staffordshire, where they use it for making tobacco-pipes, as they do another sort, which is hard, heavy, and of a greyish white, which is said to be the best of all Tobacco-pipe Clays. Besides these, there are the White Tough Clay, the Smooth Greyish White Clay, the Heavy Grey Clay, the Soft Grey Alkaline Clay, a Hard Grey Alkaline Clay, a Soft Ash-coloured Heavy Clay, and several other kinds, whose differences are not so considerable as to be particularly insisted upon. They are used for making tobacco-pipes, Dutch tiles, and several sorts of earthenware.

The EARTH of MALTA, so called from the Island from whence it is brought, is a sort of Clay of a whitish ash colour, and is imported in small cakes, marked with various characters.

There are four sorts of YELLOW CLAY, all which will ferment with Aqua Fortis; one of these is entirely yellow, another yellow with blue spots, the third is a sandy Clay, and consequently brittle, as well as the fourth, which is of a brownish yellow. They are all of use for making some sorts of earthen ware.

The Hard Brown Spotted CLAY is in some degree transparent, and is of a fine shining pale brown, variegated and spotted with deep black. It does not stain the hands when touched, and yet it adheres firmly to the tongue, having a sort of an astringent taste, but without grittiness. This is what is usually called Lemnian Earth, or The True Sealed Earth, and is brought over in small cakes, weighing above four drachms each, and marked with several characters. The island on which it is dug was formerly called Lemnos, but now Stalimene. The virtues of this Earth, or Clay, were formerly much celebrated, and it was given as an antidote against poisons. It was supposed to be of an alkaline substance, but this is found to be a mistake; for it will not ferment or effervesce with Aqua Fortis, nor indeed several others, notwithstanding what Linnæus has said to the contrary. When analysed, it is found to contain a small quantity of an urinous volatile Salt, a small matter of bituminous oil, and a little Salt like common Salt. It may be easily dissolved in Water, and has been given in some disorders; but it is now not used with us.

There are three ENGLISH CLAYS of the brown sort, as the Brown Heavy Tough Clay, with which they floor barns in some places, and in others make earthen vessels. The Dusky Bluish Brown Tough Clay, which when burnt in the fire turns to a red colour, and in a violent fire to a deep grass green; however, it is most useful for making of tiles. The Hard Pale Brown Clay is generally full of shining particles, and is of a rough kind; but being mixed with tougher Clay in Staffordshire, it serves to make strong vessels of several kinds.

The Bluish Brittle Soft CLAY has somewhat of the nature of Marl, and when dry it appears to be full of shining particles. It burns to a darker colour, and is used in several parts of England for making a very strong sort of earthen ware. The Tough Bluish Clay has an even smooth shining surface, and when burnt in the fire becomes as hard as stone, and of a fine red colour. It is to be met with in Northamptonshire, but at present is made no use of. The Hard Tough Pale Blue Clay is extremely heavy, and of a close, even texture; being burnt it turns to a pale yellow, but it will not well endure the fire. It is used to make gally-pots, and the like. The Light Soft Blue Clay is of a loose texture, and burns to a pale reddish brown; there are but small quantities found of it at a time, and therefore it cannot be supposed to be much in use in making any sort of vessels. The Hard Tough Whitish Blue Clay is supposed to be that with which they make China ware here in England when mixed with other things; however, this is not certain.

The Green Heavy Turf CLAY is a fine smooth compact Earth of a dull dusky green, and very heavy. It has hitherto been put to no use. The Pale Smooth Green Hard Clay is of a smooth, even, regular texture, very heavy, of a shining surface, and almost as hard as Stone. When a thin piece of it is held up to the light it is almost transparent; but in the fire it loses its green colour, and turns to a pale grey. It has been brought from Saxony in Germany.

VERDITER is a sort of bluish green hard Clay, and is usually dug out of the Earth in lumps of different

ferent sizes, that is, from half a pound to six pounds and upwards. It is a fine even glossy surface, and very smooth to the touch: it does not colour the hand: but when it is drawn along a rough surface it leaves a dusky green line. When burnt it is of a dusky brown colour, being entirely divested of its green or blue. It has been brought from several parts; but that from Italy is the best, and is much used by painters.

The ENGLISH VERDITER is got out of Mendip Hills in Somersetshire, and is a hard, heavy, firm earth, of a deep dusky green colour; when burnt it becomes as hard as stone, and of a very pale whitish brown colour. There is another Greyish Green Brittle Clay, that is met with in Mendip Hills, which bursts and crackles in the fire, though the change of the colour is very small; but it acquires a considerable hardness.

The Soft Pale Red CLAY is very clammy while soft, but when dry it is compact and hard, and of a very beautiful pale red, variegated with grey, at least sometimes. In the fire it grows as hard as stone, but the colour is much the same. It is brought to London from the Isle of Wight, and is said to be of some use to the workers in mahogany wood. The Pale Brownish Red Smooth Clay has somewhat of a Brownish cast, and is commonly veined with Pale Bluish Grey Clay; it is considerably heavy, and of a very close even texture. It crackles at first in the fire, but becomes pretty hard. In Staffordshire it is part of the composition of their finest earthen ware. The Dusky Brown Reddish Blue Clay is found in several parts of England, particularly in Staffordshire, where it is a principal ingredient in their fine earthen ware.

The Light Brittle Black CLAY is more dry than the generality of this sort, and not quite so tough; but it is seldom met with except in small quantities at a time. In the fire it emits a pale blue flame, with a sulphureous smell, and burns to a very deep red. It is common in many parts of England. The Tough Heavy Black Clay, while in the bed, is of a shining jet black, extremely heavy, and pretty moist, with a fine glossy smooth surface when cut with a spade; when dry, it becomes extremely heavy and compact, and will not dissolve easily in water. In the fire it becomes as hard as stone, and of a pale red colour; it was formerly unknown in England, but has been lately met with in Staffordshire and elsewhere. The Heavy Brittle Black Clay is very fine, heavy, and of a smooth compact texture. When burnt, it becomes perfectly white, for which reason in Northamptonshire it is used for making tobacco-pipes.

There are sealed EARTHS in Germany, so called, because they are marked with particular seals; the principal of which are at Gran in Hungary, and Goldberg in Silesia. That of Gran is called the Marrow of Gold; it is of a yellow colour and fat, seeming to be of a soapy substance, and melting in the mouth. It is got out of the gold mines near Gran, and is under the care of the magistrates, who have it made into round balls, and marked with the city seal. They suppose it to be impregnated with a golden Sulphur. The Goldberg Sealed Earth has the name of the Marrow of Silver, and is of a whitish grey colour. It is supposed to be derived from silver, from whence it has its name. It is not brought into medicinal practice.

CHAP. IV.

Of MARLS.

MARL is an earthy, brittle, light substance, between Clay and Chalk; for it is not so soft

and fat as Clay; nor so hard as Chalk, nor will it very easily dissolve in water.

CIMOLIAN EARTH is heavy, but loose and apt to crumble, for which reason, being thrown on the surface of the earth, it soon moulders away. It has not the least effervescence when put in water; for it only melts away, and turns to a sort of fizy liquor of a greyish colour. It is not at all affected with the oil of tartar, but spirit of salt poured on it causes it to ferment. It is pretty fat and soapy.

SAMIAN EARTH is very fine, pure, of a close equal texture, and yet remarkably light; when dry, it is of a fine bright white, with a smooth polished surface; it is very soft to the touch, and adheres firmly to the tongue; when burnt in the fire it becomes of a snowy white, and is found in the Isle of Samos; but this, as well as the former, is not at present used in medicine.

The SAMIAN ASTER is by some called Samian Earth, but it differs greatly from the former, it being of a loose texture, and will not cut into regular pieces. It is of a pale brownish white, and seems rough, dry, and dusty to the touch, but adheres firmly to the tongue. It turns to a pale ash colour in the fire, and is found between clefts of stone in the Island of Samos.

CHIAN EARTH is a dense compact substance, but of a soft texture, and easily broken in pieces. When dry it has an irregular surface of a pale greyish white, and seems to consist of numerous flakes. It is very fine and soft to the touch, adheres firmly to the tongue, and melts freely in the mouth. Thrown into the water, it causes it to bubble with a hissing noise, and melts into a substance like cream; in the fire it becomes perfectly white, and is found in the island of Chio; but it is of no use in medicine.

CELENEUSIAN EARTH, by some called Mineral Agarick, is found in the perpendicular clefts of the strata of stone, in irregular masses of a fine pure white colour. It is spongy, brittle, whites the fingers, and adheres firmly to the tongue. When thrown into water, it sends up a great number of bubbles with a hissing noise, and turns it white. It comes to a snowy whiteness in the fire, and is found in stone quarries almost all the world over.

The White Spongy Dense MARL is not so white as the former, but is of a more dense texture. It is frequently found in the cavities of stones, and, if alone, generally near the surface of the earth. When it is dry, it becomes of an uneven compact texture, moderately heavy, and of a dull dead white. It bubbles in the water like the former, with a hissing noise, and is found in many parts of England.

Hard Spongy Alkaline White MARL, called by some Native Lime, is a hard, dry, coarseish earth found in the clefts of stone, and sometimes lying loose upon, or immediately under them. It is of a dull whitish colour, with a small mixture of greyish brown, and is of a more firm texture than the former earths. It bubbles and hisses like the former, and will cement like Lime. It is found in some parts of England.

MELIAN EARTH, found in the island formerly called Melos now Milo in the Archipelago, is not unlike the Cimolian, and is made use of there for washing of linen.

CRETAN EARTH, or CHALK, was so called by the antients, because it was found in the island of Crete, now Candia; but it is now to be met with in most parts of the world, and particularly in England, in very great plenty, where there are many large hills of it consisting of nothing else. It is an Alkali, and therefore is given in acidities of the stomach, and the heartburn, when properly prepared; though some take it as it is for that purpose without any preparation. It is likewise good in coughs that proceed from an acrid phlegm. It is commonly given from

from ten grains to a drachm, but there is no danger in taking larger doses.

Bluish Chalk MARL when dry, after it is taken out of the earth, is of a hard texture, of a bluish colour, generally veined or spotted with red. It is very soft and smooth to the touch, and will not adhere to the tongue, at least very little. Burnt in the fire, it turns to a palish brown, streaked with dark red. It is found in some parts of England, and in some places serves to manure land.

Bluish Brown Brittle MARL is of a loose texture, and very light. It is soft to the touch, and adheres a little to the tongue, melting freely in the mouth, it being a pure fine earth. It is somewhat alkalious, and when burnt turns to a dirty reddish brown colour. It has sometimes a great many sea shells found in it, and is a good manure for land.

Stony Bluish MARL is the hardest of this class, and is of a rough compact texture, with an unequal surface. It bubbles in water, but will not ferment with aqua fortis, and in the fire turns to a dull dusky red. This and the former are found in several parts of England.

Yellow Brittle Sandy MARL breaks into small pieces, when dug out of the earth, and when dry is of a brighter yellow than before it was dug up, which is the property of all colours; for a little water will turn them darker. It is spangled all over with small, flat, glittering particles, and is rough and dusty to the touch. When burnt in the fire, it turns to a fine deep red, and is a good manure for heavy stiff Clay lands.

Pale Red Brittle MARL is always found in the cavities of Stone, or in perpendicular clefts of the Earth, and has a fine, compact, close texture, with an even, smooth, soft surface. It is common in Germany, Italy, and France.

Red Brittle Heavy MARL is very common in England, and is a good manure for poor hungry land. It is of a crumbly texture, and commonly very dry; it becomes of a deeper red in the fire, and much harder.

Deep Dusky Red Sandy MARL is frequently found variegated with whitish, greyish, or bluish Earths, and is of a loose crumbly texture. It melts very readily in the mouth, but leaves a great deal of harsh, sandy matter between the teeth; when burnt it becomes of a deeper red, but not much more hard, and is found in our North American Plantations.

Stony Red MARL is greatly valued by the farmers for making a good manure: for, though it is almost as hard as a stone when laid upon the surface of the earth, it will crumble to bits, which perhaps is owing to the rain, as it will break to pieces in about ten hours time in water. Fire makes little alteration in it, and it is found in several parts of England.

RUDDLE, by some called Red Ochre, and by others Marking Stone, is a sort of Marl of a thin texture, and very brittle. It is of a red colour, and has a smooth soft surface. When burnt it becomes pretty hard, but does not change the colour. It is used in the country for marking of sheep, and by the painters for colouring of pales, window shutters, and the like. The best is said to be brought from Derbyshire.

Red Heavy Hard MARL is firmer and drier than the former, it being of a regular close texture, and composed of several thin plates lying close upon each other. In the fire it burns to a darker red, and grows much harder. It is used by the furriers to mark with.

Brown Brittle MARL is of a loose texture, and easily crumbles, but makes a very good manure. It is sometimes variegated with grey, and sometimes with black, and is a little dry and dusty to the touch. When burnt it becomes of a pale red, and somewhat more hard. It is used to manure grass land in Suffex.

Fullers EARTH is well known almost to every one, being commonly used for getting greasy spots out of cloaths. It is soft, and of a greyish colour; but sometimes paler, and sometimes of so deep a colour as to be almost black; though it has always a greenish cast. It melts freely in the mouth, and for its softness and smoothness is sometimes called Soapy Earth.

Green Fullers EARTH is the most dense and compact of all kinds of Marl, and is of an even smooth texture, being extremely soft and oily to the touch. It melts freely in the mouth, and in the fire turns to a very pale brown. It is found in Germany, where it is used as common Fullers Earth.

Green Sandy Brittle MARL, though very heavy, is of a loose texture, and easily crumbles in pieces. It is found in many parts of England, and is used in Suffex to manure clay lands.

Black Brittle MARL is of a loose texture, easily crumbles, and is very heavy; though it is of a brownish black, it does not stain the hands. It is found in Mendip Hills in Somersetshire, above twenty feet deep in the earth.

CHAP. V.

Of LOAMS or EARTHS found in Strata or Beds.

THE WHITISH LOAM is coarse, loose, soft, and moist, while in the stratum; and though it is easily cut with a spade, it will not stick thereto. When dry it is of a loose crumbly texture, considerably heavy, hard, harsh, and gritty to the touch. It does not at all stick to the hand, but will melt freely in the mouth, and makes a slight hissing noise when thrown into the water, where it almost immediately falls into a loose powder. It is composed of a large coarse white sand, united to a greyish marly clay, and will burn to a pale brownish red. It is sometimes mixed with stiff clays in making of bricks.

The Brownish White LOAM is of a fine even texture, and consists of very fine white sand joined to a pale brown clay. When it is cut with a spade it leaves an even surface, and when dry it is of a whitish brown colour, but very pale. It does not break very easily between the fingers, nor does it stick to the hands; but it will melt in the mouth, though slowly, and makes a violent effervescence with aqua fortis. It is used for making bricks mixed with clay, and then turns to a pale red colour.

The Pale Yellow LOAM is of a spongy texture, and consists of white sand united to a yellow clay. When it is cut with a spade, it leaves irregular masses, with a rough uneven surface behind it, and when dry it is loose and spongy, and seems mixed with a great number of shining particles. It is harsh and dry to the touch, and crumbles readily between the fingers, but does not stick to the hand. It makes an effervescence with aqua fortis, and turns red in the fire; but it is never used alone for bricks.

The Rough Yellow LOAM consists of a coarse yellowish sand, joined to a pale yellow clay, which in a few places is white. It is smooth when cut with a spade, and when dry is extremely hard. It makes no effervescence with aqua fortis; but when thrown into the water it makes a little hissing noise, and soon falls into a loose powder. It turns to a deep red in the fire, makes excellent bricks for building furnaces for melting iron, and even endures the fires of the glass-houses; it also makes fine lutes for chemical vessels. It is met with near Hedgerly, five miles from Windsor, and bears a considerable price.

The Deep Dusky Yellow LOAM consists of a deep yellow and a whitish sand, with a very little clay, and is very harsh and coarse. It is moist in the stratum, and

and when dried is of a loose texture, readily crumbling between the fingers without sticking to the hands. It makes no effervescence with aqua fortis, nor does it hiss when thrown into water. It is used for making bricks when mixed with good clay.

The Hard Brown LOAM consists of large white sand and deep brown clay; it is very hard, but not tough, though it cannot be got up without pick-axes: when dry, it is very hard and heavy, and will not break between the fingers. It will not hiss when thrown into water, nor make an effervescence with aqua fortis. It is often full of small sea-shells; and in Northamptonshire it is so full of them that they make floors for barns therewith; it likewise serves to make roofs for ovens and other purposes.

The Light Pale Brown LOAM is the lightest and most spongy of any of this kind, and is composed of fine pale yellow sand, mixed with light brown clay. When dry, it crumbles easily between the fingers, and sticks a little to the hand. It will not effervesce with aqua fortis, but when thrown into water makes a little hissing, and almost immediately falls into a loose powder.

The Yellowish Brown LOAM consists of a white and yellow sand, together with a small quantity of fine brown clay. It is moist in the stratum, and when dry is of a loose crumbly texture, with a rough and somewhat dusty surface. It makes an effervescence with aqua fortis, and hisses a little when thrown into water. This sort alone will make fine red bricks.

The Greyish White LOAM is composed of a fine white sand and a pale bluish clay, spangled with a great number of small plates of talc. While in the earth it is moist and soft, but when dry is very heavy and compact, with an even smooth surface; but it will not break between the fingers, nor stick to the hands. It raises a great effervescence with aqua fortis, when thrown into water makes a slight hissing, and after a little time breaks into small lumps. When burnt it becomes very hard, is of an agreeable reddish colour, and will make good bricks when mixed with a proper clay.

The Pale Yellow LOAM is of a loose spongy texture, and consists of small whitish sand with a pale yellow clay. It is pretty tough in the stratum, as well as moist; but when dry it becomes firm and hard, and is spangled with talc. It will not break readily between the fingers, nor stick to the hands, nor yet make any effervescence with aqua fortis: when thrown into water it makes a very little hissing, and soon falls into a loose powder. It is proper for making fine red bricks.

The Yellowish Brown LOAM has a very loose texture, and is composed of yellowish sand with fine brown clay. It will not effervesce with aqua fortis, but it makes a very small hissing when thrown into water, where it moulders into powder after some time. Mixed with ashes it is greatly used near London for making bricks.

The Reddish Brown LOAM consists of a hard whitish sand, and a reddish brown clay. It is pretty firm in the stratum, and when dry becomes very hard and heavy. It will not effervesce with aqua fortis, and it hisses but little when thrown into water, where it falls into powder after some time. This Loam serves for making bricks in many parts of England.

The Red Sandy LOAM consists of fine pale yellow sand, and a bright red clay, mingled with fragments of a very red iron ore, and a great deal of reddish dusky spar. While it is moist it is quite loose, and of a very deep red; but when dry it is of a pale red, and of a very loose texture, for which reason it crumbles to powder between the fingers. It will effervesce with aqua fortis, and burns to a fine florid red. The land composed of it is very proper for rye, barley and pease.

The Brittle Brown Sandy LOAM is an earth partly sandy and partly stony, and when dry will not keep together in a lump, the texture being so loose and spongy. It makes a brisk effervescence with aqua fortis, and hisses pretty much when thrown into water. Those lands that consist of this are accounted poor and barren.

The Greyish Brown Sandy LOAM is composed of small white sand mixed with pebbles, and is full of cavities which are smooth and glossy at the bottom. It is pretty tough and very heavy, and has a rough rugged appearance, without any dust on the surface. It does not readily crumble to powder, nor does it stain the hands. It makes little or no hissing when thrown into water, nor does it effervesce with aqua fortis. Land consisting of this is very good for barley.

The Heavy Yellowish Brown Sandy LOAM is composed of a great number of different hard particles; a brown gritty stone, a yellow sand, pieces of spar, and a very glittering bright white sand, with a brownish spongy earth. It is hard, heavy and somewhat tough, and in dry seasons breaks into very large masses, though it is of a very brittle loose texture. It is very dusty and hard when dry, and very sticky in wet seasons, which renders the walking on it very slippery and troublesome. It makes a considerable effervescence with aqua fortis, and burns to a pale red with very little hardness. Some of these last are more properly called Moulds than Loams, though they are placed in the same class.

CHAP. VI.

OF OCHRES.

LIGHT Brittle Pale Yellow OCHRE is between the colour of brimstone and what is called a cream colour, and is of a loose crumbly texture, it being composed of very thin fine plates. It is extremely light, and separates into flakes, in the fire, of a dull reddish brown colour. It is found in Pennsylvania and Virginia, and with water makes a straw colour, but with oil a pleasant yellow.

Hard Heavy Pale Yellow OCHRE is well known to the painters, and is of a close, compact, firm texture, with a smooth even surface; when burnt in the fire it turns of a dull pale red, and becomes considerably hard. It is found in several parts of Europe, and particularly in Somersetshire.

Light Crumbly Yellow OCHRE is commonly seen at the mouths of the springs of the Spa kind, and at present is made very little use of; nor can it be expected in any large quantities. In the fire it turns to a pretty good red.

Light Brittle Gold Coloured OCHRE is found in small lumps in the earth, and is very light, being of a crumbly texture, and stains the hands of a true gold colour. It turns to a bright red in the fire, and becomes a little more hard. It is common among gravel in several parts of the kingdom, particularly on Mendip Hills, where it lies in the clefts of the strata. It is also in a gravel pit on the right hand of Oxford Street, about a mile from London. When burnt it turns to a red, and might probably be of use to painters.

Light Plated Saffron Coloured OCHRE is sometimes found making a stratum, and sometimes in the perpendicular clefts of other strata, and is of a soft crumbly texture, with a rough and even surface, but colours the hands with a very beautiful yellow. It burns to a dusky red, and is common in Northamptonshire and Staffordshire.

Common Yellow OCHRE is a dense heavy earth, of a dull yellow colour. It ferments pretty much

with aqua fortis, and burns to a pretty good red. It is greatly used for house painting.

Hard Heavy Clayey Yellow OCHRE is very compact, and when dry is of a very fine bright yellow, with a smooth glossy surface. It burns to a red, but crackles in the fire. It is found in Buckinghamshire and Yorkshire, and is sometimes used by the painters.

Stony Hard Heavy Yellow OCHRE is in great plenty about Oxford, but it is so hard that it is not to be cut with a spade, and therefore they are forced to use pick-axes. It crackles a little in the fire, and turns to a fine red. It is used by the painters.

Dull Dusky Yellow Clayey OCHRE is found in several parts of England, and is dense, compact, and heavy. It is of a dusky unpleasant colour, though it burns to a very fine pale red, and becomes almost as hard as stone.

Light Clayey OCHRE, of a brownish yellow, is sometimes found among other strata, and in their perpendicular clefts. The surface is smooth and glossy, and the texture very fine; it burns to a dead dusky brownish red. It is found in several parts of England, and being of a good body is used by the painters.

NAPLES YELLOW is of a bright beautiful colour, between that of gold and saffron; but it is very loose, spongy, brittle, and porous, and ferments pretty briskly with aqua fortis. When burnt it turns to a deeper yellow, and is found in Italy, particularly about Naples. It is generally esteemed a pretty good colour.

Brittle Heavy Red OCHRE is common in several parts of England, and is of great use among the painters. It crackles a little in the fire, where it becomes more hard, and of a paler colour. It is used by painters for priming the coarser sort of works.

Brittle Purple OCHRE is common in Spain, of a very fine colour, and, though of a loose texture, weighs very heavy. It is of a fine deep purple before it is dug up, and when dry it turns red. It is a strong Alkali, and therefore ferments greatly with aqua fortis; in the fire it turns to a paler colour.

INDIA RED is a very fine purple earth, of a firm, compact, and hard texture, it being heavy, and almost as hard as a stone. Before it is dug up it is of a blood colour, but when dry of a fine glowing red, and is full of bright glittering particles of a whitish colour. In the fire it burns to a greater hardness without much changing the colour. It is found in the Island of Ormus in the Gulph of Persia, from whence it is by some called the Persian Earth.

Bright Red Brittle OCHRE is found in Bengal in the East Indies, and though used in France is not much known in England. It is of a fine, bright, florid red, and pretty heavy, though it crumbles between the fingers, and stains the hands. It ferments with aqua fortis, but undergoes little alteration in the fire.

VENETIAN BOLE is a sort of an Ochre, and is well known among painters, it being of a fine bright pale red, being pretty nearly of the colour of Red Lead. It grows harder when burnt, but the colour is worse. It is brought hither from Venice.

Pale Red OCHRE is light, brittle, and of an alkalious nature, for it ferments very briskly with aqua fortis. It somewhat resembles the Venetian Ochre, only it is brighter, and of a little paler colour. It is found in Florida, and is very probably in other parts of America, though it is not much known in England.

Pale Red Clay OCHRE is found in North America, and, though pretty heavy, is of a loose, brittle texture. It is nearly of a flesh colour, and burns to a good red in the fire. It is at present made no use of.

EARTH of Sinope is so called from a town of that name in Natolia, and is a sort of a Bole, sometimes of a deeper, and sometimes of a paler colour. It has been sometimes used in medicine, on account of its being of a drying nature, and particularly in fluxes of the belly.

Red CHALK is of a very dense compact substance, and is of a dull red colour. Some use it in the manner of crayons, or rather like black lead pencils. It is very well known to painters, and therefore needs no farther description. It is found in several parts of Europe, and particularly in Flanders.

Red Stoney Ochre is the hardest and driest of any of this kind, and is found in regular strata in the earth, but is so hard that it cannot be got up without pick-axes. It is of a fine purplish red, and is very heavy, being mixed with fragments of Lead Ore, of a bright bluish colour; as also a small quantity of pure native Cinnabar. It burns to a fine red, and becomes more hard in the fire. The painters call it Indian Stone Red, it being brought from China; but it is very scarce.

Brown UMBER is a sort of Ochre, and is greatly used by painters. It is found loose in small lumps among gravel, and sometimes in the perpendicular clefts of other strata. It is very light, though of a close compact texture, and burns to a deep brown in the fire. It is generally brought from abroad, there being very little of it in England, though it is thought to be in Mendip Hills in Somersetshire.

COLOGN EARTH, commonly called Cullens Earth, is well known among the painters, and is of a dusky brown, with a close, compact, fine texture, but extremely light. It is not at all gritty, and has the taste of oak bark. Being thrown into the water, it swims on the surface till it is quite wet, and soon breaks into a very fine powder. It is easily set on fire, and never goes out till it is reduced to pale yellow ashes; from whence it appears to be of a vegetable nature, owing its origin to wood long buried in the earth. It is brought to us from the city of Cologne.

The ARMENIAN STONE is very opaque, and mixed with green, blue, and black spots, somewhat in the manner of Lapis Lazuli. It is of an even, regular texture, and the general colour is a beautiful blue. Some think it differs in nothing from Lapis Lazuli but in hardness, and is like that very scarce. It was formerly used in medicine as a purge and vomit, and the dose was from six grains to a scruple; but it is now out of use, except among the painters, for when it is prepared it yields a fine blue colour, with a greenish cast.

Green OCHRE, or TINCAL, is of a dense, compact substance, though of a coarse irregular texture, the surface being rough and uneven, and the colour of a pale green. It is found in many parts of Germany in and near the copper mines, and it partakes very evidently of copper. By burning it turns to a hard dusky brown Ochre, and therefore is only used in its natural state, it being reckoned a very good paint.

Heavy Brittle Black OCHRE is found in masses of different sizes, in the perpendicular clefts of stone. It is of a fine deep black, and of a compact, even, close texture, though it breaks very readily into small pieces between the fingers, and slightly stains the hands. It is common about Mount Sorrel in Leicestershire.

Black CHALK is found in broad flat pieces from two to ten feet long in the earth, and from four to twenty inches in breadth. It is moist and flaky when just taken out of the ground, but soon becomes pretty hard, and very light. It will cleave very easily one way, and seems to be the offspring of wood buried in the earth; for it will burn, but not

so long as Cogn Earth. It is much used in painting, and is to be met with in Spain, Italy, and Germany.

C H A P. VII. Of B O L E S.

A BOLE is a heavy fat earth, which readily adheres to the tongue, and colours the fingers. It is of various kinds.

ARMENIAN BOLE, or BOLE ARMENICK, is sometimes white, and moderately heavy, being of a close compact texture, and having a very smooth surface. It is very scarce, and therefore being quite unknown to the shops it need not be insisted upon.

White Brittle BOLE is moderately heavy, with a smooth surface, though it will crumble between the fingers. It will ferment with aqua fortis, and in the fire may be burnt to a sort of Lime. It is brought from Germany.

NOCERIAN EARTH is very heavy, and of a greyish white, but not so brittle as some of this kind. It has no taste, nor does it ferment with aqua fortis. It is met with in Italy, and some think it good for the bite of mad dogs, and in malignant fevers.

ERETRIAN EARTH is a fine kind of Bole of a greyish white colour, and pretty heavy, with a smooth surface, though it crumbles very easily between the fingers. It ferments very briskly with aqua fortis, and in the fire it turns perfectly white and as hard as stone. When a little wetted and drawn over a copper-plate, it will leave a line behind it, which in a short time turns bluish. It is dug up in Negropont, near the antient Eretria, from whence it has its name.

Whitish ALKALINE BOLE is hard, of a close compact texture, and like other Boles melts gradually in the mouth. It ferments but slightly with aqua fortis, but in the fire turns to a pure white. It is found in the East Indies.

The Yellow ARMENIAN BOLE is of a saffron colour, and of an earthy, heavy, fat, brittle substance, with an astringent taste, it is of a close compact texture, with an extremely smooth surface and very hard; but it melts on the tongue, though very slowly. It ferments briskly with aqua fortis, and in the fire becomes more hard, and of a deeper colour.

BOLE of Blois is of a pale yellow, and of a compact texture, but very light, and readily crumbles between the fingers. It ferments violently with aqua fortis, and becomes almost as hard as stone in the fire, turning to a much darker colour.

BOLE of Tokay is of a yellow colour and brittle, but very fine, and considerably heavier than the former. It melts easily in the mouth, and ferments violently with aqua fortis; in the fire it becomes considerably hard, but does not change the colour.

SILESIAN SEALED EARTH is a sort of Bole which is pretty heavy, and of a compact texture, with a smooth surface. It turns to a kind of chocolate colour, in the fire, and becomes considerably hard; but is a stranger to our shops.

LIVONIAN EARTH is a very fine Bole, and very brittle; it is of a dully dusky yellow with a reddish cast, and its surface is smooth and glossy. It becomes of a harder texture and a darker colour in the fire, and is usually sealed with the figure of a church, an escutcheon, and two cross keys. It is not only found in Livonia, but in Spain and Portugal, wherewith they make a sort of earthen ware.

BOHEMIAN BOLE is of a deeper yellow than that of Tokay, it having a small mixture of red. The surface is very smooth and shining, and it melts readily in the mouth.

Red BOLE ARMENICK is the hardest of all

Boles, and is of a reddish yellow colour, not unlike that of saffron. It melts readily in the mouth, and has an astringent taste. That is the best which will most readily beat to powder with a pestle, or dissolve in water, without the least sandy sediment. Its virtues have been greatly cried up in various disorders; but it is now seldom met with in the shops.

FRENCH BOLE is of an earthy substance, and of a pale yellowish red; it is heavy, brittle, and of an astringent taste. It ferments very slightly with aqua fortis, and in the fire becomes of a somewhat redder colour. It is often mixed with sand or small stones, and therefore it should be mixed with water before it is used, and poured off, after the grosser parts are sunk to the bottom. It is reckoned a good astringent, and is now used in the room of all other Boles, but seldom alone.

The Sealed EARTH of Striga is of a deep dull red, and has a tolerable smooth surface. It will crumble between the fingers, and melts readily in the mouth. It ferments a little with aqua fortis, and becomes harder in the fire, without any change of colour.

Red Sealed EARTH of Livonia is considerably heavy, though of a loose texture, and of a paler colour than the red Silesian Bole. It dissolves readily in water, and has a strong astringent taste. The fire makes little or no alteration in it.

TUSCAN SEALED EARTH is a heavy pale red Bole, with a smooth surface, and easily breaks between the fingers. It grows hard in the fire, and the colour becomes somewhat more dark. It is dug up near Florence, and is said to be good in loosenesses and excessive bleedings.

PORTUGAL EARTH is a brittle, heavy, fine red Bole of a close texture, with a smooth shining surface. It becomes a little harder in the fire without change of colour, and is very common in the northern parts of Portugal.

TURKEY SEALED EARTH is of a greyish red colour, and of a looser texture than some other Boles. The surface is soft and smooth, and it breaks easily between the fingers; in the fire it becomes considerably hard, and of a dusky yellow colour. It is said to be good in the plague, and to promote sweat. The hard pale red Bole is moderately heavy, and remarkably hard. It is of a beautiful pale red, or rather of a flesh colour, with a very smooth glossy surface. In the fire it becomes as hard as stone, and the colour acquires somewhat of a blue. This is found in North America among our plantations.

Pale Brown Hard BOLE is very pure, of a compact texture, and moderately heavy. It consists of thin plates laid closely upon each other, and has a smooth shining surface. It cracks and bursts in the fire, flying off in small flakes at first; but afterwards becomes considerably hard, and of a pale red colour. It is met with in Germany, as well as in America, and in some parts of England.

Pale Brown Heavy Dense BOLE is very compact, and speckled with white and yellow. The surface is a little rough, but it may be polished by rubbing. It burns to a dusky red, but does not acquire a much greater hardness; it is found in many parts of Germany.

Light Brittle Round Bole is of a looser texture than others of this kind, and is less weighty. It has a smooth equal surface, but readily crumbles between the fingers. It easily dissolves in water, and is a little astringent to the taste. It becomes considerably hard in the fire, and turns to a dark dusky red colour. It is found in several parts of England.

Greenish BOLE is very fine and beautiful, and considerably heavy. It is compact, and of a pale dusky greenish colour, with a smooth glossy surface. It has a brackish disagreeable taste, without any remarkable

markable astringency. It becomes considerably hard in the fire, and turns to a dusky brownish red. It is found in the West of England.

C H A P. VIII.

O F T R I P O L I E S.

SILVER CHALK of the antients is of a snow white, and its texture is somewhat loose and spongy; for it is very light, and has a rough uneven surface. It easily breaks between the fingers, and has a taste like that of Pumice stone, but with no sandy grittiness. It grows hard in the fire without changing colour, and is found in Prussia, where it is used for cleaning and polishing silver vessels, from whence it has its name.

The Yellow TRIPOLI is of a firm texture, moderately heavy, and is only yellowish in the Earth; for when it is dry it becomes white, and almost as hard as stone. In the fire it turns to a beautiful pale red: it is found in several parts of Europe; but the greatest quantity is met with in Africa. It is called Tripoli from a city of that name in that part of the world. This and the former, as well as all of this kind, are composed of harder particles than Ochre, for which reason they are of greater use in polishing metals.

Reddish White TRIPOLI never makes a stratum in the earth of itself, but is found in distinct masses among other strata. It is pretty hard, though of a loose texture, and consists of a multitude of plates or flakes lying upon each other. It is met with in Germany, and on Mendip Hills in England. It is used in polishing brasses.

The Melian EARTH of Dioscorides is a hard, heavy, ash coloured Tripoli, and is of a loose, open, spongy texture, very readily falling into powder, it being very brittle. It consists of very harsh particles, and is extremely rough to the touch. It has a disagreeable styptic taste, somewhat like Alum; but the fire makes no great alteration in it. It is found in the islands of the Archipelago; but it is not much known in England, and consequently not used by workmen.

Light Brittle Greenish Red TRIPOLI is of a loose spongy texture, and remarkably light, with a rough uneven surface. It easily breaks between the fingers, but does not colour the hands, and undergoes no alteration in the fire. It is found in several parts of the world, as well as in Somersetshire.

ROTTEN STONE is a sort of Tripoli of a brown colour, and is very soft and light while in the earth; but out of it becomes more hard. Its texture is light and spongy, and it is dry, hard, and rough to the touch. It becomes a little more hard in the fire, and acquires a reddish cast. It is found in Derbyshire, Shropshire, and Somersetshire, and is of great use in polishing brasses.

Hard Pale Brown TRIPOLI has sometimes a little cast of red, and is somewhat heavy, it being of a close compact texture, and almost as hard as stone; but it is more smooth than other Tripolies. In the fire it becomes more reddish. It is found in Wiltshire, and serves for the same purposes as the former.

Sparkling Brown TRIPOLI is the heaviest of this kind, though it is of a loose texture. It seems to abound with a sort of spangles that glitter pretty much, though the surface is rough and irregular. It ferments briskly with aqua fortis, and in the fire becomes of a fine red, and pretty hard. It is not very uncommon in England, but has never been put to any use.

Brownish Red Sparkling TRIPOLI is very light, it being of a looser texture than any of this tribe;

but it is full of a great number of large glittering particles, and has a rough irregular surface. In the fire it undergoes little alteration. It is found in Wiltshire, Suffex, and other parts of England. It is not fine enough to be used for any thing else but polishing Brasses.

C H A P. IX.

O F I S I N G - G L A S S, M O S C O V Y - G L A S S, and T A L C.

ISING-GLASS consists of shining scaly particles, or flat plates, and that called Moscovy Glass is of the same nature; or rather, both these names are given to the same substances.

White Shining ISING-GLASS is usually found in masses of a smooth and even surface, except at the edges; it is sometimes from eight to twelve inches broad, and from half an inch to three thick. It will cleave into innumerable thin plates or flakes, and is as transparent as the finest glass, instead of which it is used for putting before small prints generally designed for children, as also by some miniature painters for covering their pictures. They may be split, with care, so as not to be thicker than leaf gold, and yet still have a sort of springiness or elasticity, for which it is very remarkable. In the fire it becomes as white as silver, but then it ceases to be transparent. It is found in various parts of the world, particularly in Russia or Moscovy.

Bright Brown ISING-GLASS is not so beautiful as the former; but it has much the same texture, and, like that, will cleave into plates or flakes; but the surface is not quite so even. It is very bright, though not so transparent as the former, and is more subject to flaws and cracks. It soon becomes white and opaque in the fire, and then readily breaks to pieces, though it seems to be adorned with silver spangles. It is found in Germany; and it is said, there have been small pieces of it met with in England.

Bright Purple ISING-GLASS is as even and regular as the first kind, and may be cloven into as many flakes as that. While the flakes are pretty thick they are of a fine beautiful colour like an amethyst; but when split into thinner plates it becomes paler, and in the thinnest of all, the colour is wholly lost. It also loses its colour and transparency in the fire, becoming entirely white. It is found in Moscovy and Persia, and by some it is called Red Talc.

TALC is a shining stone, and will split into very thin plates, which are transparent and a little flexible. It will not melt in the fire, nor will it admit calcination, nor lose its colour. It is of various kinds.

VENETIAN TALC is well known for the several attempts that have been made to reduce it into a sort of paint to beautify ladies' faces. Linnæus calls it Whitish Talc, consisting of plates almost transparent, which feel like suet to the touch. The masses of Venetian Talc are from one to five or six inches in diameter, with a very rude irregular surface, full of prominences and cavities. It is of very little use in medicine, it being employed only as a cosmetic to render the skin more white and shining. The best way is to reduce it into an impalpable powder, the shortest way of doing which is to heat it red hot in the fire, and then quench it in cold water; this must be done several times, after which it may be ground upon a porphyry into an exceeding fine powder shining like silver. This, when mixed with pomatum, is what the ladies call cold cream. The chemists have endeavoured to get the oil of Talc, but without success; though they suppose it would

would turn brass into silver. If any thing of this kind has ever been procured, it has been owing to the additions, and not to the Talc itself.

Shining Black TALC, with small leaves, is of an irregular complicated texture, like the former, and is found in masses, which have a rugged surface from one to four inches in diameter. They are composed of a prodigious number of irregular scales very closely but unevenly laid together, which will easily split into irregular flakes. None of the Talcs, nor yet the Ifing-Glasses, can be made to strike fire with steel, for which reason they are called by Linnæus, *Apyri*, that is, without fire. They likewise remain unchanged in the fire, and cannot be dissolved by acids.

Shining Gold Coloured TALC, with small spangles, is called by some writers *Mica aurca*, from its shining like gold. It is found in small masses of a loose, irregular, brittle texture, with an uneven surface, but never exceeding an inch and a half in diameter. It is composed of a multitude of small flakes or spangles, with sometimes a mixture of a sort of crystal. These flakes are very small, being seldom above a quarter of an inch broad; but they are extremely smooth and soft to the touch. It is found in several parts of Europe, particularly in England.

Shining TALC, with the appearance of silver, has spangles of various sizes, is known to some by the name of Glimmer or Cat-silver, and is very brittle, readily parting into flakes of which it consists. The masses are very small, being seldom above the fifth part of an inch in length. It is found in several parts of Italy, as well as in England, and in some places looks like shining sand.

Greenish Shining TALC, with very small spangles, is of a very pure kind, though it does not shine so much as the two former; but it is very brittle, and of an irregular shape, with a rough scaly surface. Its masses are found from one inch to eight or ten in diameter, which seem to be composed of very small spangles, which will readily stick to the fingers in handling. It is found in great plenty on the shores of Italy, and there has been some found in England, on Mendip hills, but in no great quantity.

Greyish Green TALC, with small scales, is of a very dull colour, and has a distant resemblance to the Venetian Talc, though the structure is very different. The flakes are of different sizes, but usually small, and lie in various directions, being of no determinate shape, and they are not so transparent as the other kinds. It is found on the shores of Yorkshire and Lincolnshire.

Grey Shining TALC, with very thin scales, is rather brighter than any of the former kinds, and consists of a vast number of plates or flakes, lying in a very confused and irregular manner, and of various sizes and shapes, the larger not being above half an inch in breadth. In the fire it turns as yellow as gold, and shines like it, it being the only Talc that changes in the fire. It is very common on the English shore.

Bright Green Shining TALC, with broad spangles, is found in masses that are composed of others that are smaller, and these consist of very fine thin plates, which are generally wrinkled and turned several ways. The colour is very beautiful when unbroken; but, when the flakes are separated from each other, it is quite lost. It is considerably heavy, and loses its greenness and transparency in the fire. It is found in the beds of rivers in Italy.

Shining Greyish Yellow TALC, with small scales, makes a very splendid appearance, and is found in masses of eight or ten inches in diameter, which are composed of a great number of very broad, thin, light flakes. The surface is bright and glossy, but never even. In the fire it loses all its

yellowness. It is found very frequently on the shores of Italy.

White Sweet-Scented TALC, with undulated scales, is by some authors called the Violet stone, on account of its smell. It is found in masses of a very compact and firm texture, though rough and irregular on the outside; these are from an inch to twelve in diameter; they consist of a prodigious number of thin snow-white flakes adhering very closely to each other. These are of various sizes, without any regularity, and lie in all directions, being as soft to the touch as those of the Venetian Talc. In the fire it turns to a dusky brown red. It is common on the shores of Italy, and on the mountains of Germany.

Besides these, there are other TALCS not so easily cloven as the former, which consist of small plates in the form of spangles, and consequently are very distinct from the former.

The Shining Bluish Brown TALC is usually found in masses of a pretty firm compact texture, with rugged unequal surfaces, and in the shape of pebble stones, from the size of a horse-bean to five or six inches in diameter. It consists of small, but generally thick spangles cohering firmly to each other, and, though irregular, nearly of the same shape. They are very hard and harsh, feeling more like stone than common TALC, and consequently are hard to be separated from each other. They are very heavy, and yet will not strike fire with steel; but the fire will bring them to a pale redish grey without transparency.

Dull Pale Red TALC, with scales of various sizes, is usually found in masses from two to eight inches in breadth. It is composed of a vast number of scales that lie closely together in a very agreeable order; but they are mixed with an opaque substance of the same nature with the scales, only they are not of the same shape, nor well disposed: They seem to have very smooth and even surfaces, and are as smooth to the touch as Venetian Talc, to which they seem to have some distant relation. Though this Talc is considerably heavy, it will not strike fire with steel, but will turn in the fire to a pale whitish grey. It is very common on the shores of Lincolnshire.

The East-Indians have a Heavy, Shining, Orange-Coloured TALC, which has a smaller number of plates than any of the other kinds. They have likewise another bright purple Talc, which is so clear and elegant, that it might not improperly be placed among gems.

There are other TALCS that seem to be chiefly composed of fibres or filaments, and are, therefore, by authors called fibrous Talcs.

ENGLISH TALC, so called in the shops, is of a coarse, harsh, rough kind, with an unequal surface, and of a loose brittle texture. It is found in masses from one to eighteen inches broad, and seldom more than two inches thick. It has a rough, irregular, wrinkled surface, and consists of considerably long coarse fibres, that run pretty regularly through the whole mass. It may be easily cloven according to the directions of the fibres, which, however, are so brittle that they seldom come off whole. It is of a dull, dead, whitish colour, and the filaments, when separated, appear a little glossy. It will not strike fire with steel, but when calcined it turns to a perfect white. It is found in clay and marl pits, as well as among the strata of gravel, and the fissures of stone, and it will burn into a very good plaster, for which reason it is called the plaster stone; when burned it is used for cleaning silver lace.

Glossy Yellowish White TALC, with broad straight fibres, is of a very close texture, and is found in thick flat masses of a very beautiful straw colour, but is seldom three inches over either way. It is composed

F O S S I L S .

Class VI. *Extraneous Fossils.* Plants in Stone.



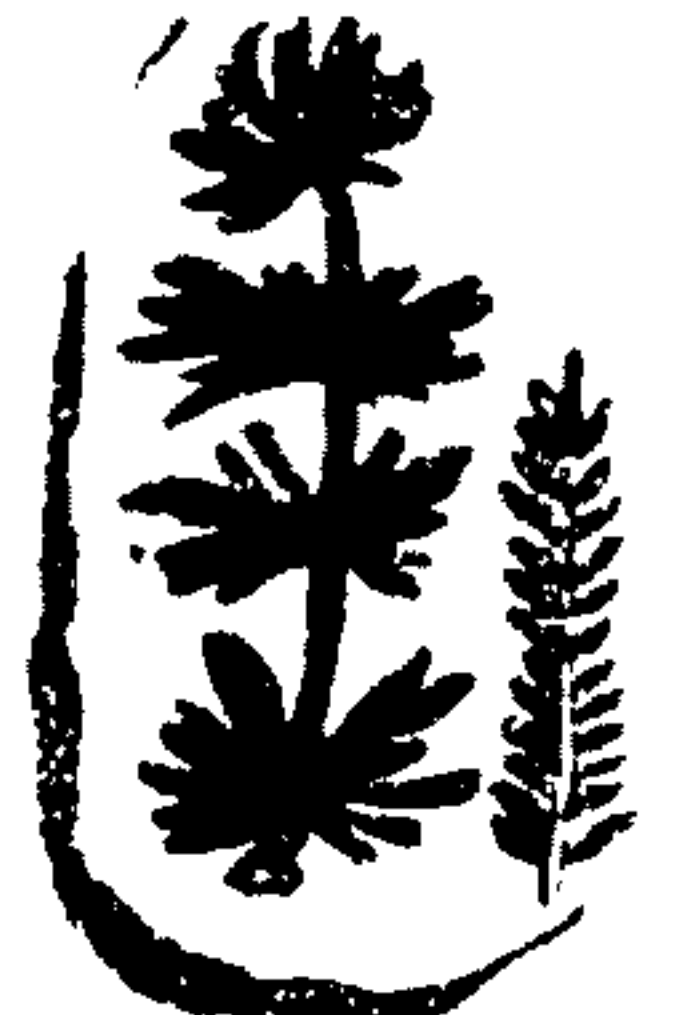
American Fern



Horsetail



Stellate Plants



Mosses



Ear of Corn

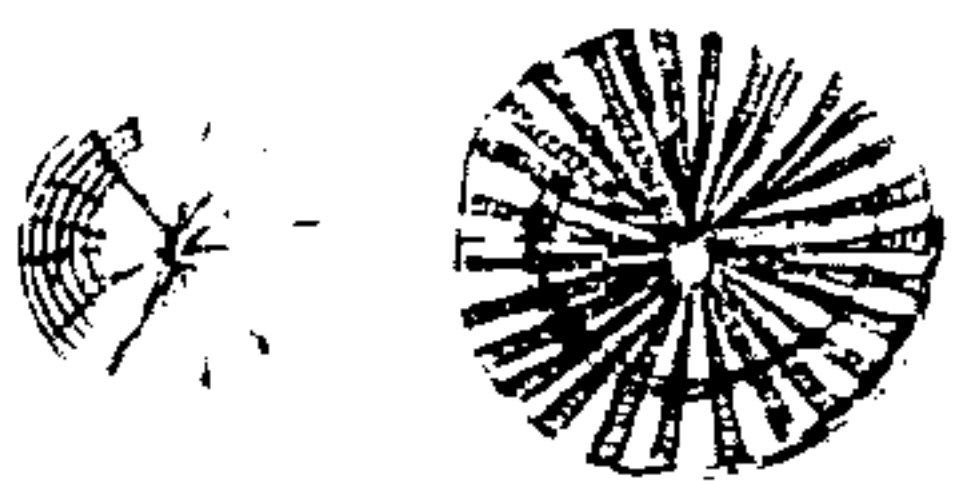


Leaves of Trees

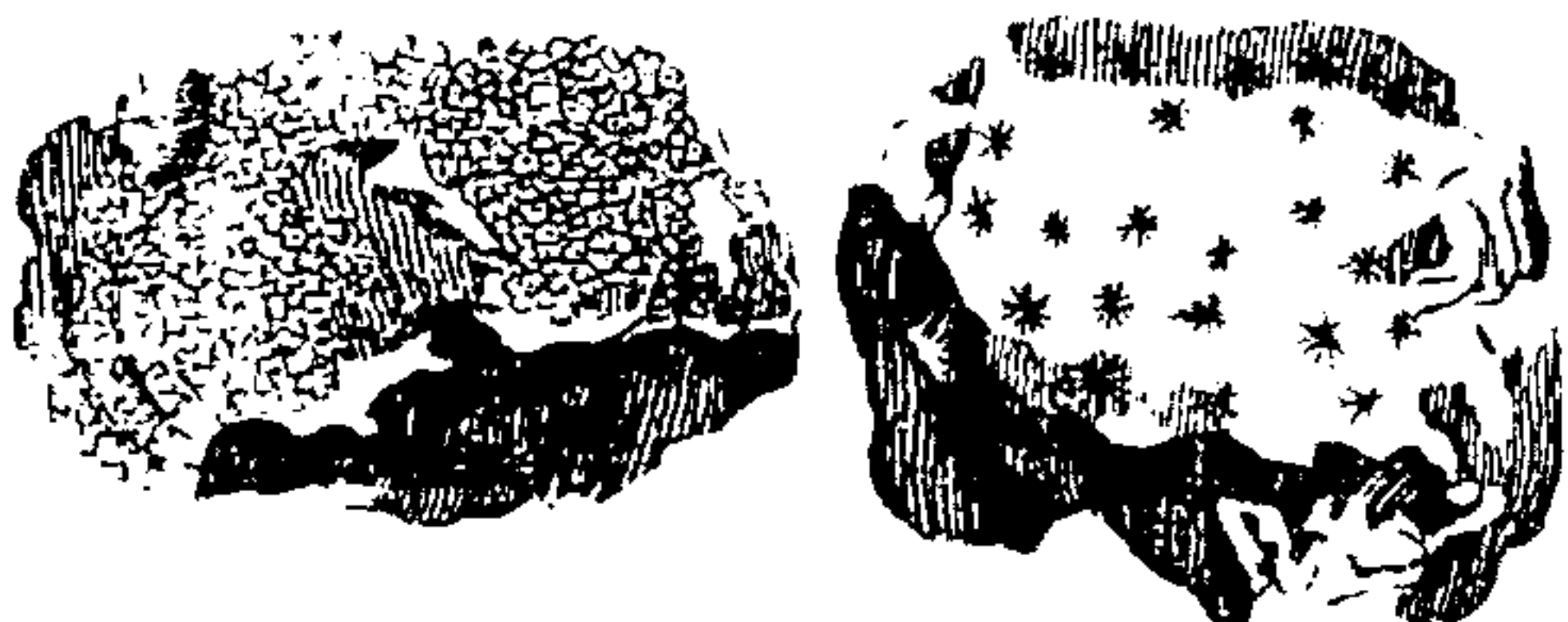


Class VII. *Cerals*

PORPITES



Astroites or STAR Stone.



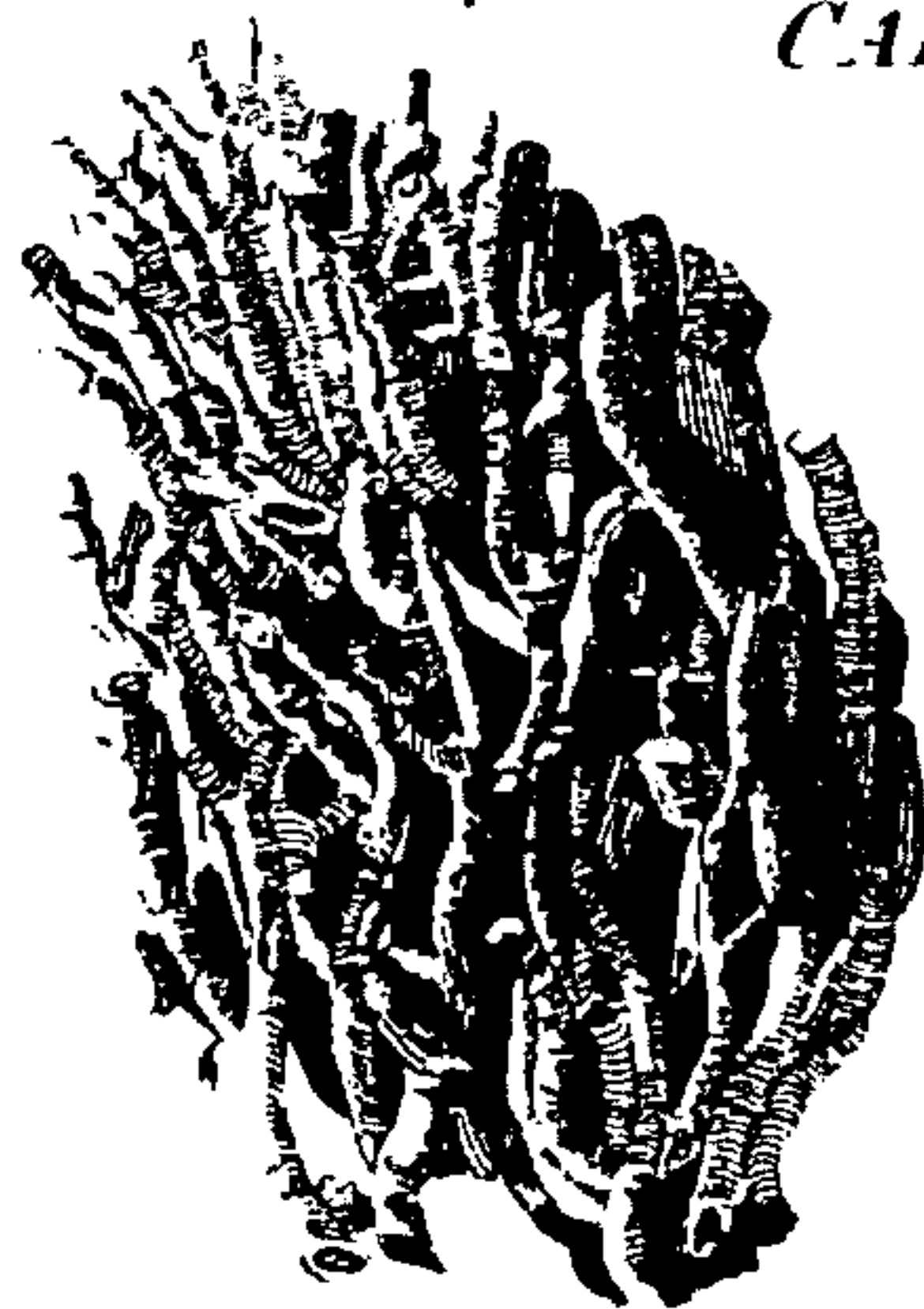
PORUS



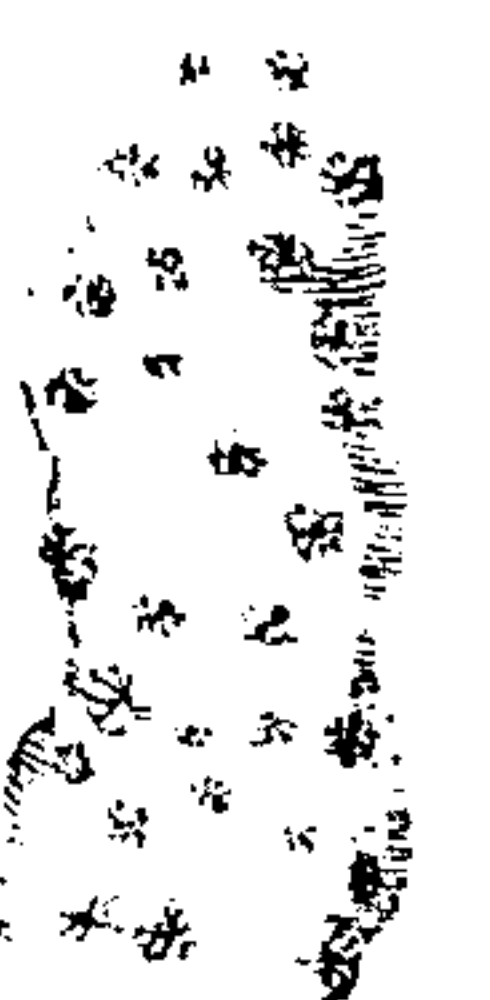
TIBULARIA



JUNCI Lapidæi



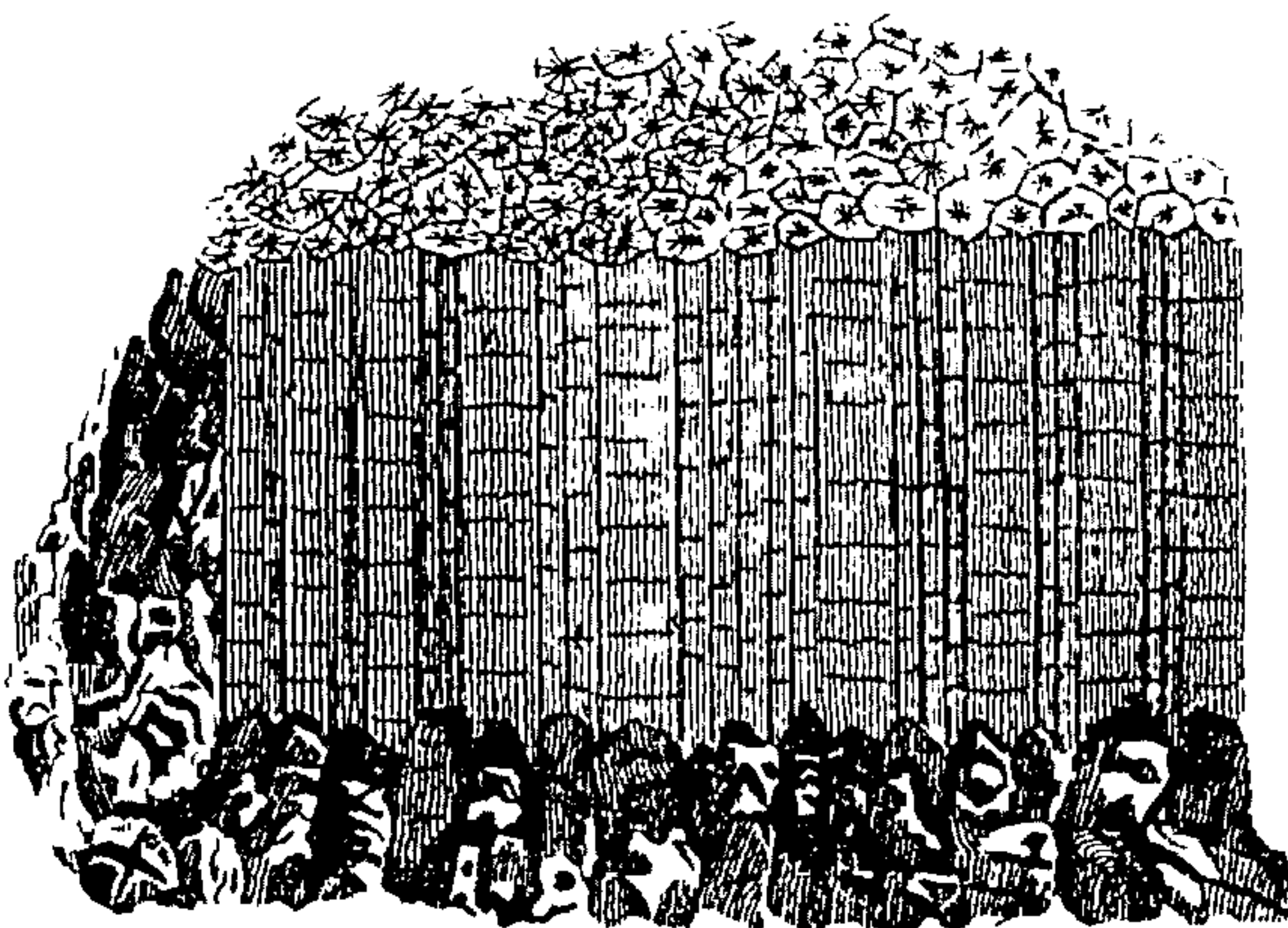
CALAMUS Indicus



MYCETITES



LITHOSTROTION

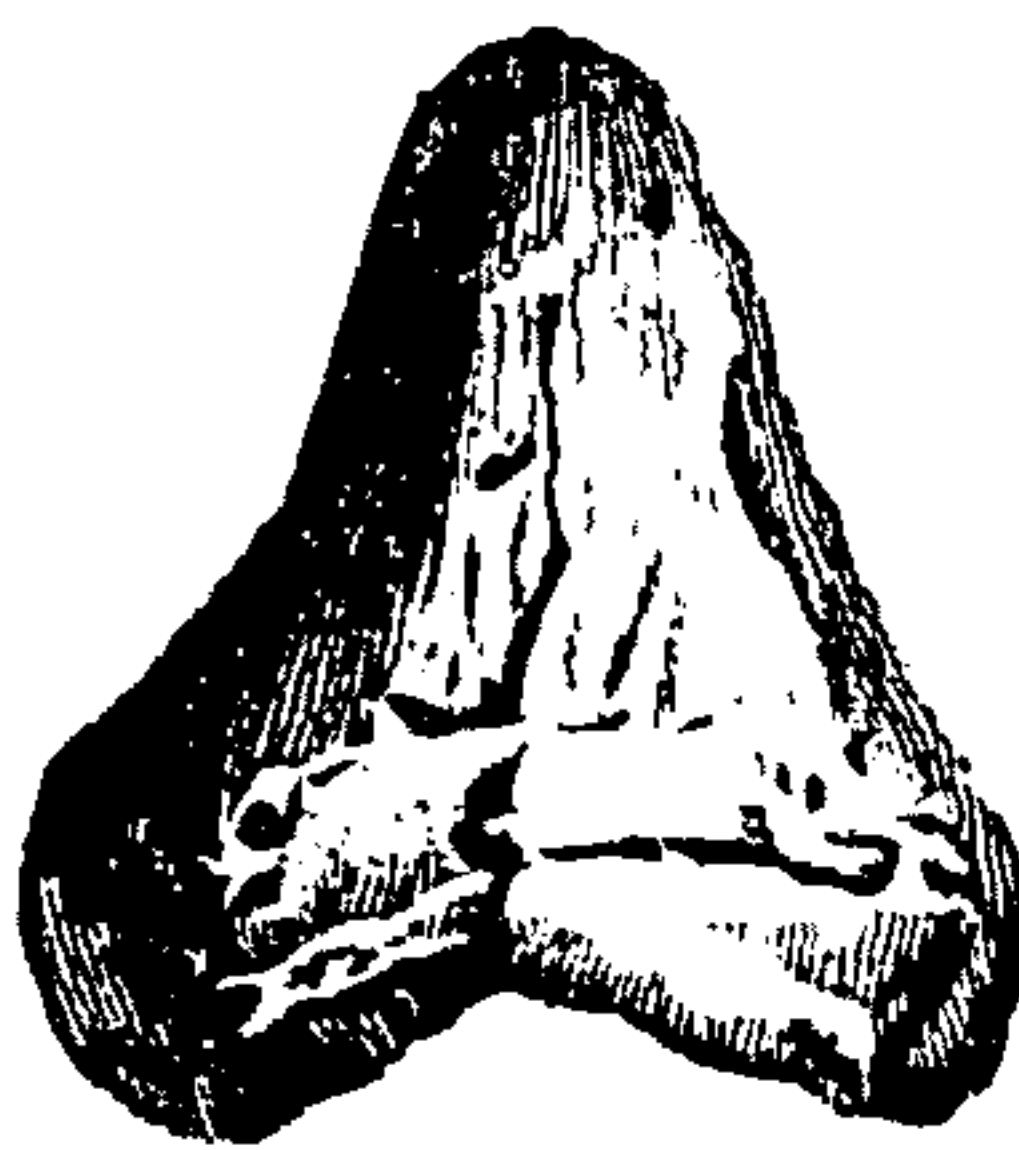


CORAL

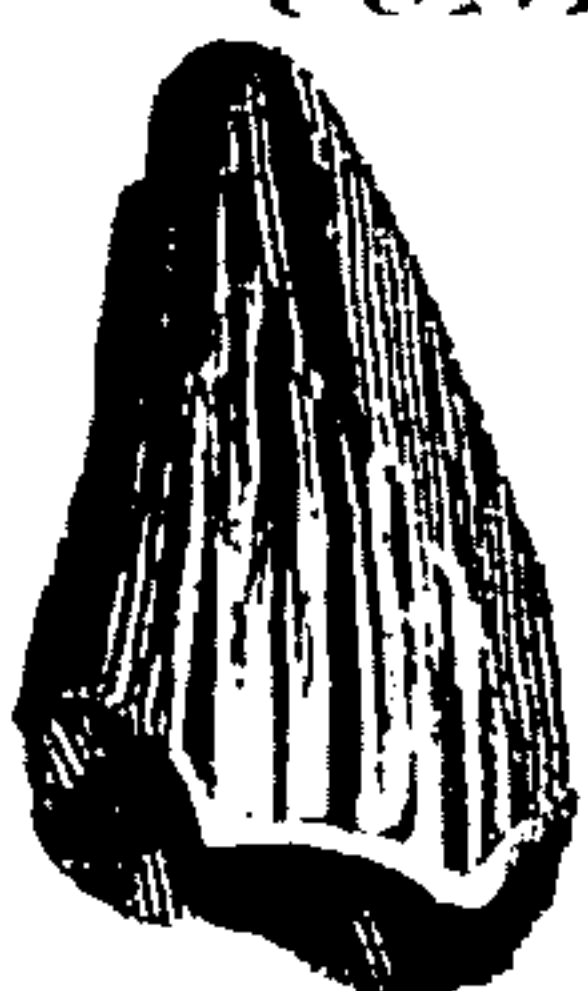


Class VIII. *Fishes Teeth*

GLOSSOPETRÆ or Lamudontes



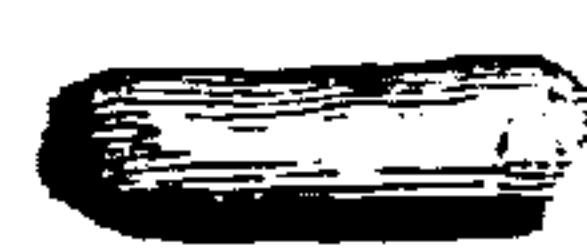
CONICHTHYODONTES or Plectronitæ



BUFONITÆ or Lycodontes



ICHTHYPERIA or Siliquastra



composed of filaments that are perfectly straight, and may be very easily cloven; but the fibres cannot be divided singly from each other, being so very brittle. It turns in the fire to a pure white, and is found in the stone pits of Northamptonshire.

Bright white TALC, with broad filaments, is of a loose brittle texture, and is found in large broad and pretty thick white masses, and where fresh broken it is very glossy and bright. The filaments are much broader at the top than at the bottom of the mass, it being above an inch upwards, and very even and glossy; they may be cloven very thin, but they will not bend, having no spring. It calcines in the fire to a white plaster, and is very plentiful in the alum pits of Derbyshire.

Flesh-coloured Fibrous TALC, with narrow filaments, is not so bright as others of this class; but it is of a fine smooth close and compact texture. Its horizontal surfaces, formed by the ends of the fibres, are smooth and even, but not glossy. The masses are from three to twelve inches broad, and sometimes five inches thick. It consists of single fibres, which run throughout the whole length of the mass without interruption; but they are very brittle, though smooth and glossy. It will easily calcine in the fire, and will turn into very good plaster. It is chiefly found in Yorkshire.

Dull White TALC, with very sharp narrow filaments, is of a very compact firm texture, though it is only found like white veins in other substances, particularly red marl. The fibres are of various lengths, but they are all continued without interruption through the veins, and are from the breadth of a horse hair to half an inch. It will not easily cleave, and when it does, it is not perfectly straight, because the filaments run a little obliquely.

The Greenish White Glossy TALC, with straight narrow filaments, is of a perfectly even and regular texture, being very firm, compact and hard. It is found in broad thin masses of a fine glossy white, with a greenish cast, from two to fourteen inches broad, and to an inch and a half thick. When held up to a good light it is pretty transparent, and in the fire turns perfectly white.

CHAP. X.

Of FOSSILE SUBSTANCES that are not elastick, and composed of short Fibres.

SOME authors call these Lachnides, from *Lachne*, a Greek word, signifying hair or down.

The Flesh-coloured Pale Glossy LACHNIS, with short, broad, and crooked filaments, is found in very broad flat masses of a whitish flesh colour, which have a very smooth, even, and somewhat glossy surface at the top and bottom; some of them are eight or ten inches broad, and from one to four thick; and they are composed of flat broad filaments, irregularly placed, and lying in oblique angles. These masses will cleave perpendicularly according to the direction of the filaments; though they adhere pretty closely together at their sides, and have very smooth glossy surfaces. They will neither ferment with aqua fortis, nor strike fire with steel; but in the fire they will turn to a perfect whiteness. It is found in the marl pits of Derbyshire, but is of little use.

Greenish-White Glossy LACHNIS, with broad oblique filaments, is found in large, broad, thick masses, with its horizontal surfaces very uneven, rough, and rugged. It is sometimes seen near two feet broad, and six or seven inches thick. It consists of pretty bright glossy filaments that are very broad, but placed in no regular order, nor continued through the whole thickness of the mass, which

separate it transversely into several rows, separated by narrow veins of greenish white marl. The whole mass is easily cloven and separated into transparent filaments that will not bend. When in the fire it soon calcines to a white plaster.

Dull Greyish White LACHNIS, with thick oblique filaments, is of an extremely compact and firm texture, and is found in very large, thick masses, from two to eighteen inches in diameter, and nearly as thick the other way. It is composed of eight or twelve rows of filaments, sometimes making angles with each other. It is not easily cloven, the filaments being so harsh and brittle, that they are separated with difficulty to any tolerable length. It is very heavy, and yet it will not strike fire with steel, nor will it very easily calcine into plaster.

Dull White LACHNIS, with straight broad filaments, is of a pretty close texture, and extremely brittle. It is found in short thick masses, from two to six inches in breadth, and sometimes four inches thick. It is only composed of two rows of filaments that are pretty broad and very irregularly placed, meeting each other at the centre; they are so extremely brittle that they can never be cloven directly. It will turn to a very good plaster very soon in the fire, and is found in the marl pits of Derbyshire.

The White Glossy LACHNIS, with broad oblique filaments, is of a very irregular texture, but very glossy. It is found in large flat masses, from two to ten inches broad, and from half an inch to above an inch thick. It consists of several rows of very broad glittering filaments, confusedly woven with each other at their ends, and they are all very short and broad, though bent and waved in different manners, making all sorts of angles with each other. It is hard to be cloven, nor can the filaments be easily separated, they have so firm a consistence. They are soon turned by fire into a fine white plaster. It is very common in Yorkshire in the blue clay pits.

Dull Flesh-coloured LACHNIS, with broad, short filaments, is very brittle, and of a coarse, harsh, irregular structure. It is often found from eight to twelve inches broad, and six inches thick. It consists of broad, short, and very obliquely ranged filaments, divided into three or four beds, by the thick horizontal earth it is lodged in. The filaments are short and crooked, and adhere slightly to each other on the sides, which render the mass very brittle and easily cloven. It is easily burnt into plaster, and is found in the alabaster pits in Derbyshire.

The beautiful Flesh-coloured glossy LACHNIS, with slender filaments, interwoven with each other, is of a very short, fine, smooth, equal texture, and is extremely firm, compact, and hard. It is found in flat masses, from four to six inches broad, and seldom above an inch thick. There are four or five rows of fibres that go to the making up less than an inch in thickness. It is difficult to cleave, the filaments being not easily separated from each other. It may be calcined very soon to a fine white plaster. It is found in Somersetshire and other places.

The Bluish-White LACHNIS, with very narrow straight fibres, is of a fine smooth texture, and pretty compact; it is found in flat masses from ten to fourteen inches in breadth, though seldom above an inch thick. It is composed of three or four rows of orders or filaments standing perpendicularly on each other; these filaments being straight render the mass easy to be cloven or split, and they have pretty smooth glossy substances. They soon calcine to a very white plaster. It is found in the marl pits of Staffordshire.

The Glossy Greenish-Grey LACHNIS, with broad and very thin filaments, is found in masses

four or five feet in breadth, being seldom above four or five inches thick. They consist of two rows or orders of filaments that are interwoven with each other at their internal ends; but they are always bent, and often placed obliquely. It will calcine, though but slowly, to a very white plaster.

The Glossy Greenish-White LACHNIS, with narrow bent filaments, is found in masses frequently as thick as broad, being sometimes no more than an inch in diameter, and at other times twelve inches. It is composed of many rows of interrupted filaments, variously bending and intersecting each other, which have very smooth unequal surfaces; though they are very hard and heavy, they will not strike fire with steel, and they calcine very slowly in the fire. It is found in the marl pits of Derbyshire. All these Lachnides may be accounted a sort of Talc, or at least akin thereto.

CHAP. XI.

Of FOSSILS, called ASBESTOS and AMIANTHUS.

MOST authors that have treated upon fossils make Asbestos and Amianthus to mean the same thing; that is, what some call Earth-flax, and others Plumous Alum; but this last name has been very improperly applied: for the Plumous Alum is a real salt, which is found in an island in the Archipelago, called Melo. However, Linnæus makes a distinction between Asbestos and Amianthus; for he would have the latter to consist of longitudinal fibres, and the former of those that are interwoven.

Incombustible flax is a sort of Amianthus, and consists of flexible fibres, like thread, lying parallel to each other, and easily separated. The ancients spun these fibres, and made a sort of cloth thereof, in which they wrapped up the dead bodies they intended to burn, that they might preserve the ashes; for, when the body was burnt, the cloth remained entire. The Germans call it mountain flax; and it is found in Lapland, Siberia, and in the vallies of the Pyrenean mountains; but the largest quantity is brought to us from Negropont. When handled it causes an itching in the skin, and sometimes blisters, which is owing to the fibres or down, of which it is composed, getting into the skin; however, it is easily cured, by rubbing the part with oil, which will soon blunt the points of the down.

There is another Amianthus, with angular, rigid, and opaque fibres, which some call Asbestos, with hard parallel fibres, not to be separated from each other. These are of an ash colour, and the whole has pretty much the appearance of wood. It is found in Lapland, Sahlberg, and other places. There is another Amianthus, consisting of stiff fibres that are easily separated from each other; but they are as brittle and transparent as glass, and of a greenish colour. A fourth sort is known in the shops by the name of Plumous Alum, and consists of exceeding brittle parallel fibres, that can hardly be separated from each other. It is found in Sweden.

Linnæus has also three sorts of Asbestos; namely, that which is heavy, and consists of hard fibres, formed into a sort of flakes or plates. It will readily cleave, and is of a pale colour; but is so heavy it will not swim in water. The Swedes call it mountain flax. Another Asbestos is membranous; that is, it consists of fibres so interwoven, that it resembles old leather. It will swim upon water, and the surface of it is hard, smooth, light and white. The third sort consists of flexible fibres that cross each other irregularly, and is so light that it is called by the Swedes mountain-cork; indeed, it looks like the

inward bark of cork, and is so porous a stone that it will swim in water.

Other authors have the Greenish Asbestos, which is extremely smooth, firm, compact, and exceeding soft to the touch. It is found in the form of veins in a sort of marble, and its filaments are slender and bent. It is met with in the isle of Anglesea, and other parts of Wales, in lumps, seldom larger than a nut.

Whitish-Brown Silky ASBESTOS is called in America petrified wood, its texture being even, regular and close. It is extremely soft and silky to the touch, and of a whitish-brown colour. It consists of long continued flat filaments, and is found from one to three inches long.

Greyish Silky ASBESTOS, with very long continued and roundish fibres, which run in straight lines the length of the whole mass, is found in lumps from two to nine inches long, and the fibres are so placed as to make it look like a piece of wood. It is found in the Highlands of Scotland.

Greyish-Green Silky ASBESTOS, with long continued and very slender fibres, is found in the isle of Cyprus, in bits not exceeding a quarter of an ounce in weight, though sometimes three inches long, and half an inch broad.

White, Loose, Thready ASBESTOS, with broad fibres, is found in length from two inches to twelve; and sometimes the fibres seem to be bundled up like the threads of cotton in the wicks of lamps. This is found in the Highlands of Scotland.

Soft, Reddish-Black AMIANTHUS, with short, abrupt filaments, is found in the strata of iron ore, sometimes forming veins of an inch in diameter, but seldom so large. In the fire it turns to a very pale red. It is common in Germany among iron mines.

Greyish-Green, rigid AMIANTHUS, with short, abrupt, and interwoven fibres, is said to be the Plumous Alum of the shops; though Linnæus affirms it is an Asbestos.

CHAP. XII.

Of the FOSSILS called GYPSUMS.

AUTHORS are not well agreed what Gypsum properly signifies; for some would have it to be the lime of alabaster, others a sort of plumous alum, others ling-glass, and others again the lime of the stone called Selenites; but it is more generally taken for the lime of certain whitish stones, which when burnt, contain some shining particles like Talc, and which are required to be but a short time in the fire before they turn to lime. But the Gypsum that is meant here includes those sort of fossils that are composed of small flat particles, which are ranged irregularly, and give the whole masses somewhat of the appearance of softer marble, they being bright, glossy, and in some degree transparent. They will very easily turn to lime in the fire.

Hard white GYPSUM, or plaster of Paris stone, has somewhat the appearance of loaf sugar, it being pretty fine, and of a very close, firm, compact texture. It is found in masses from four inches to four feet in diameter, and, when broken, shines like crystal. In the fire it readily turns to a very fine plaster. It is chiefly found in France.

Hard Shining red and white GYPSUM, that has the appearance of marble, is found in masses four or five feet in breadth, and three in thickness, with a rough, dusky, dark surface; but when broken it is bright and glossy. It does not turn into plaster, when calcined, so soon as the former. It is common in Yorkshire and Derbyshire.

Hard

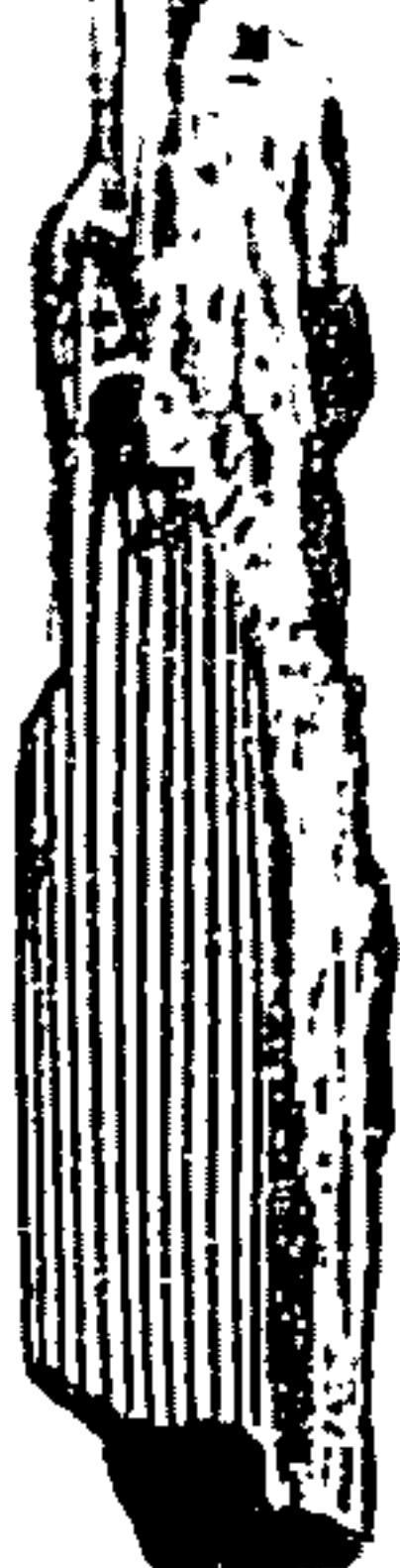
F O S S I L S .

CLASS I. NATIVE FOSSILS

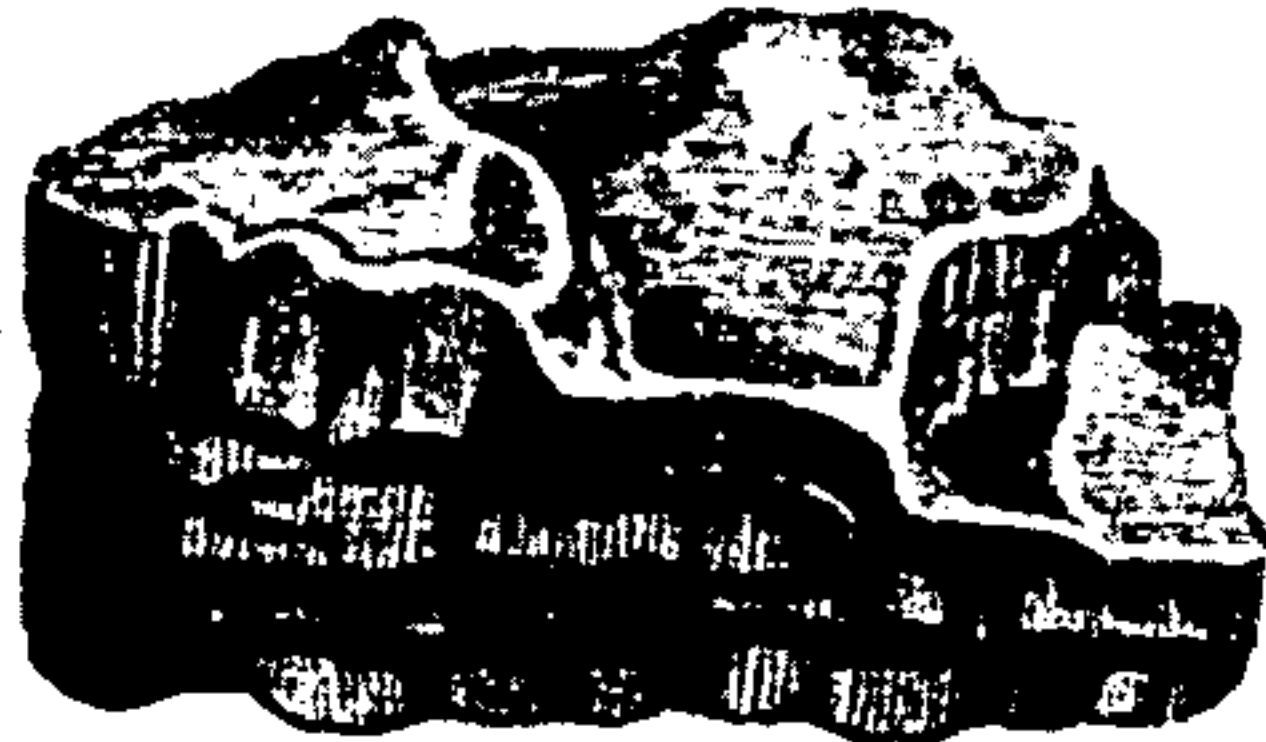
AMIANTHUS



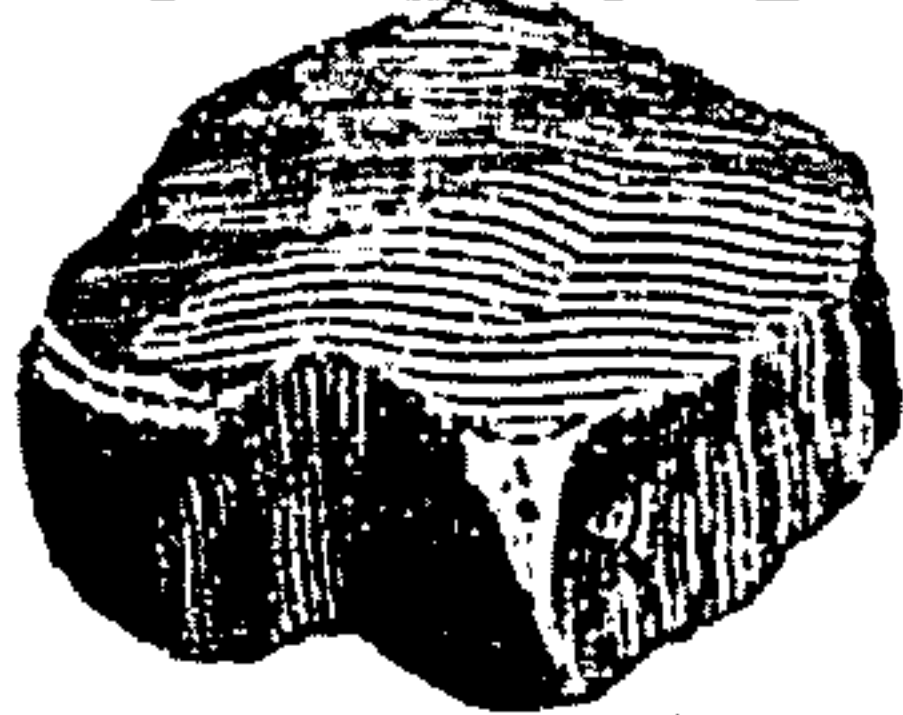
ASBESTOS



LACHNIS



TRICHERIA



ELASMIS



BRACTEARIUM HYALINA

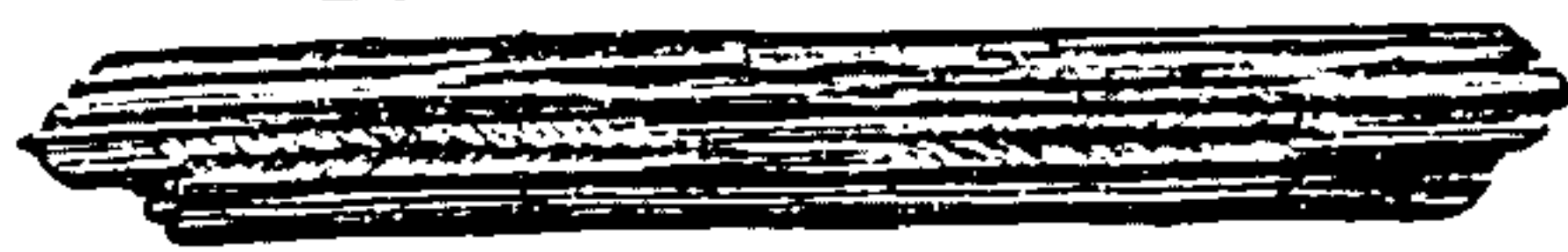


SPECULARIS



CLASS II. SELENITÆ

ISAMBLUCIS



ISCHNAMBLUCIS



TETRADE

CARHOMBIS



PACHODE

CARHOMBIS



LEPTODE

CARHOMBIS



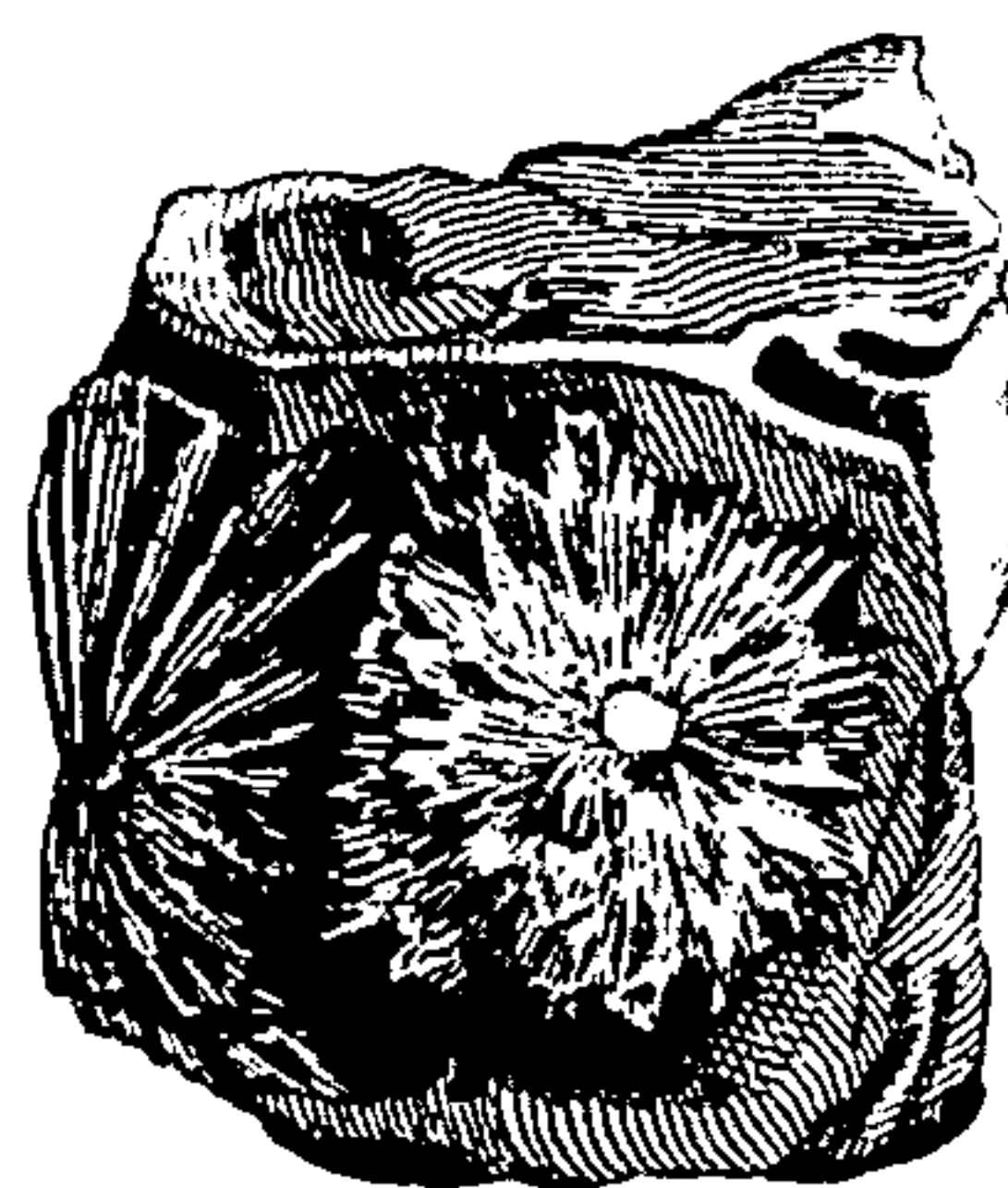
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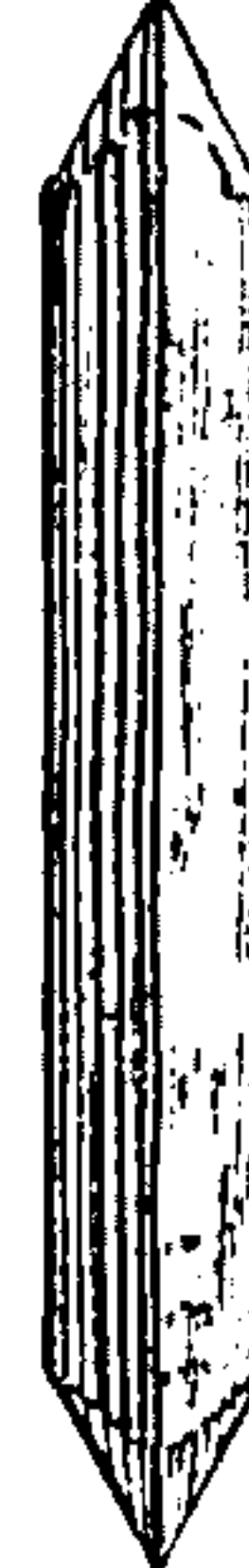
SANIDIUM



LEPASTRUM



INOXUCIA



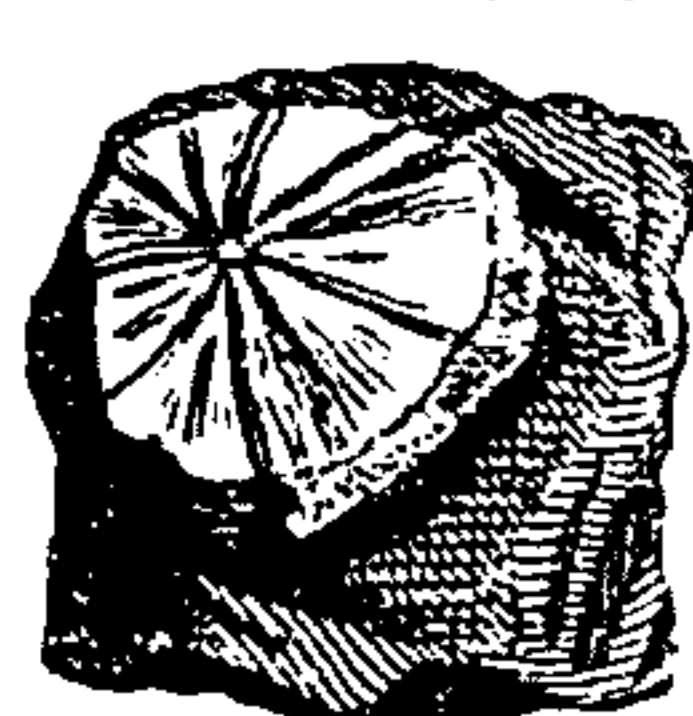
OXUCIA



SYMPLEXIUM



TRICHESTRUM



CLASS III. CRYSTALS

ELIPOMACROS

TYLUM



POLYAEDRASTYLUM



PAURAEDRASTYLUM



BRACHYTELOSTYLUM



MACROTELOSTYLUM



OLIGAEDRUM



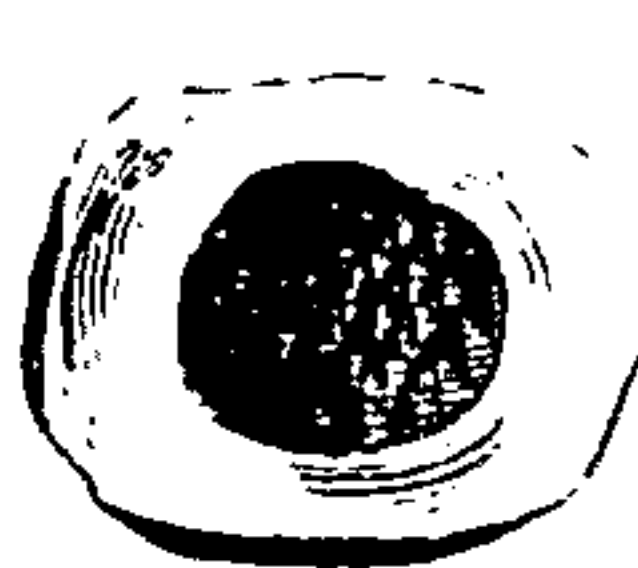
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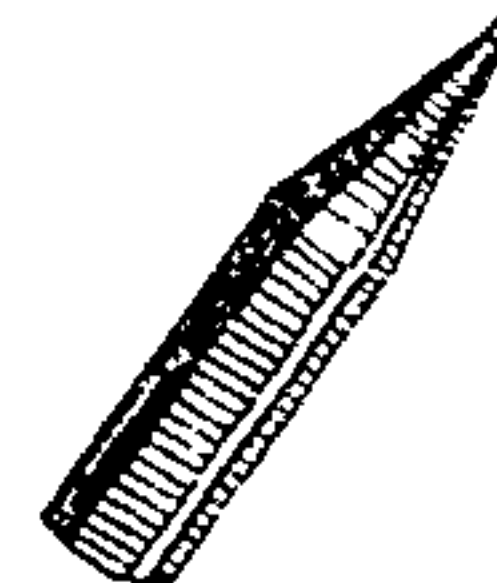
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ARTHRODIA



PANGONIUM



MOLYBDION

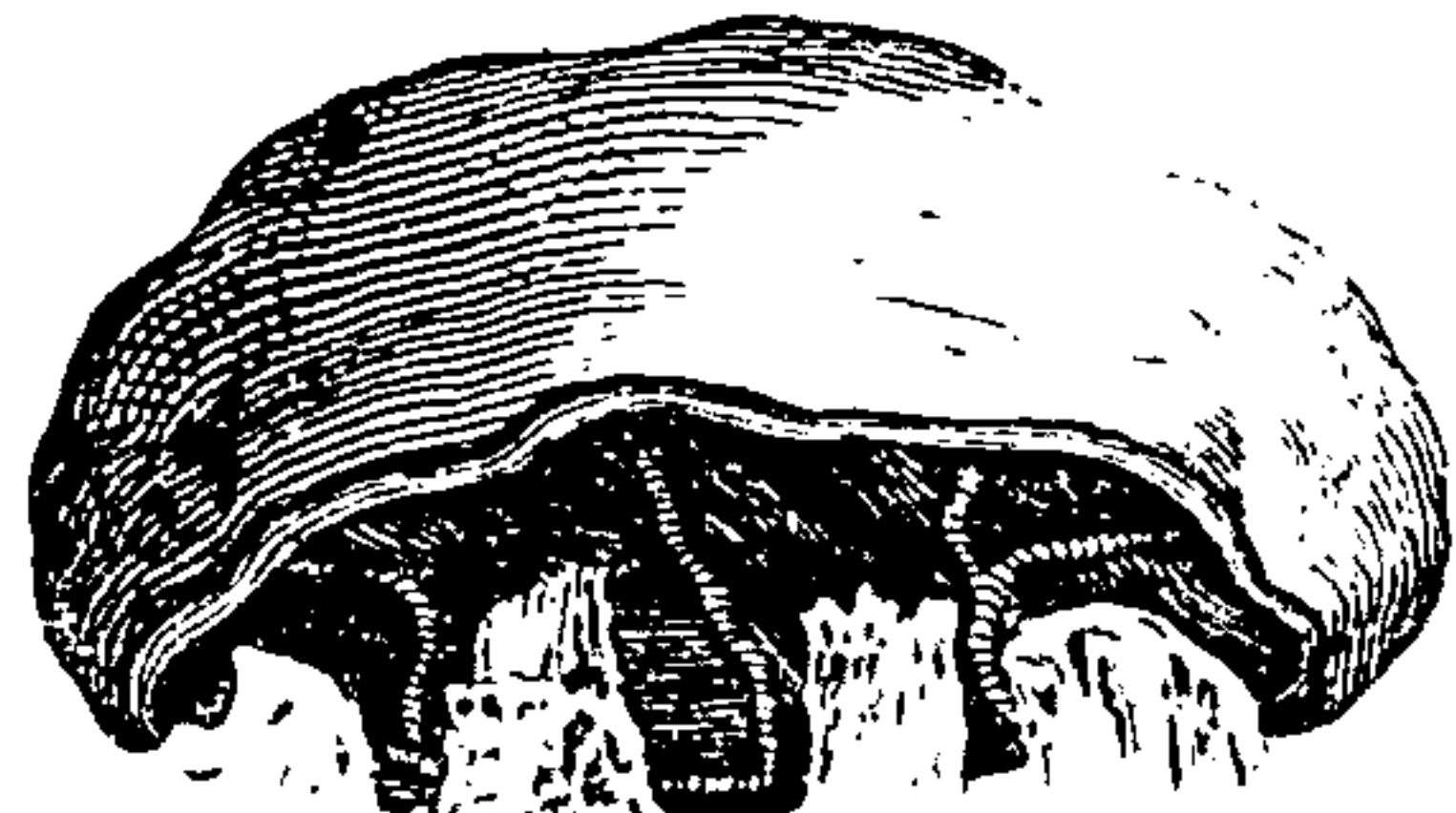


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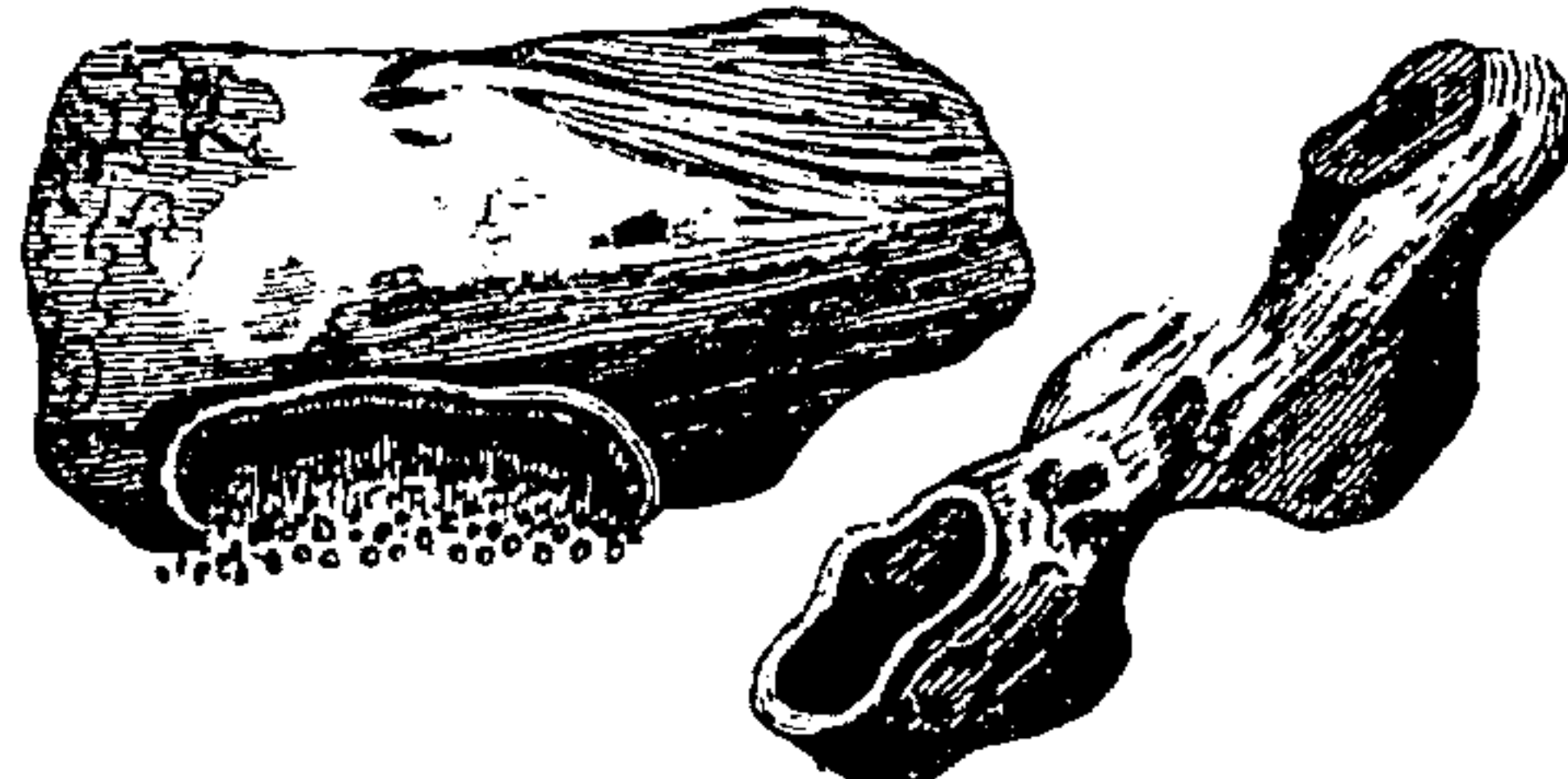


CLASS IV. SIDEROCHITÆ

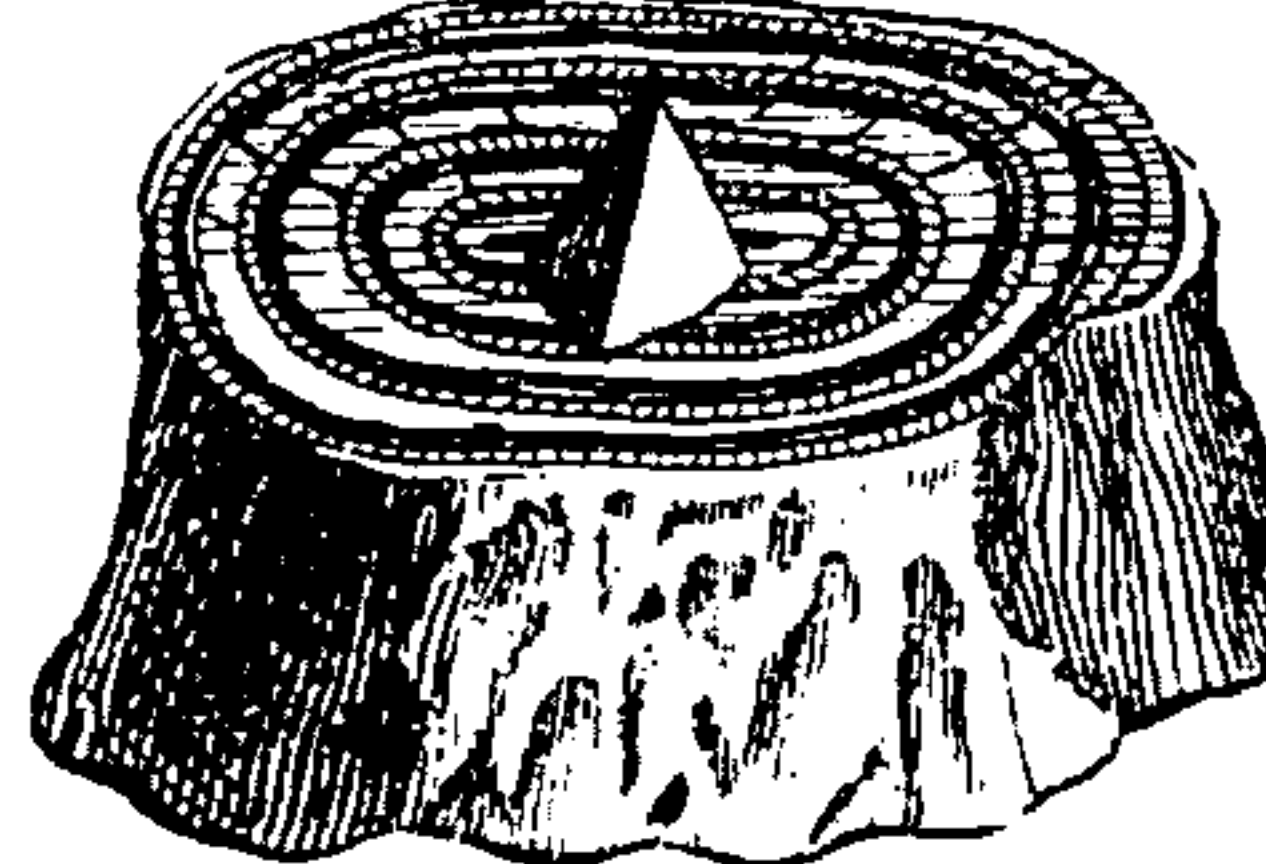
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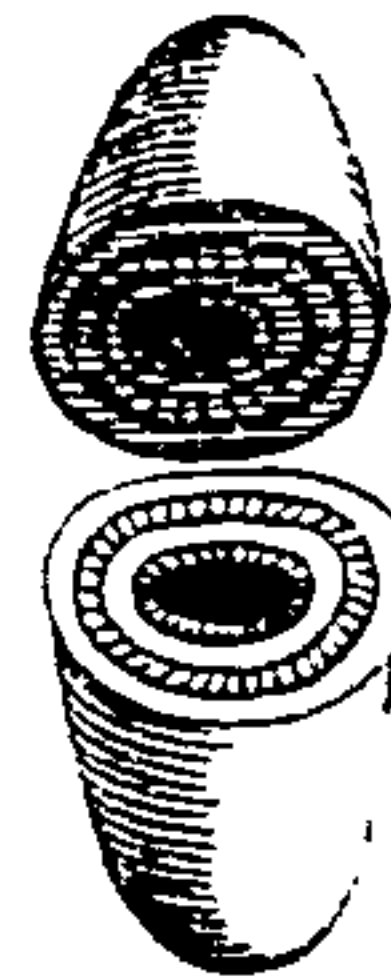
GEODES



HETEROPYRA

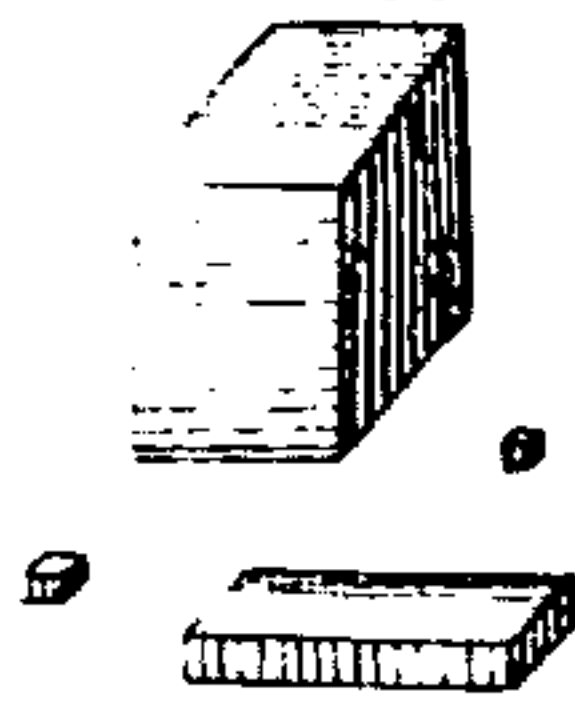


EMPHERE PYRA



CLASS V. PYRITÆ

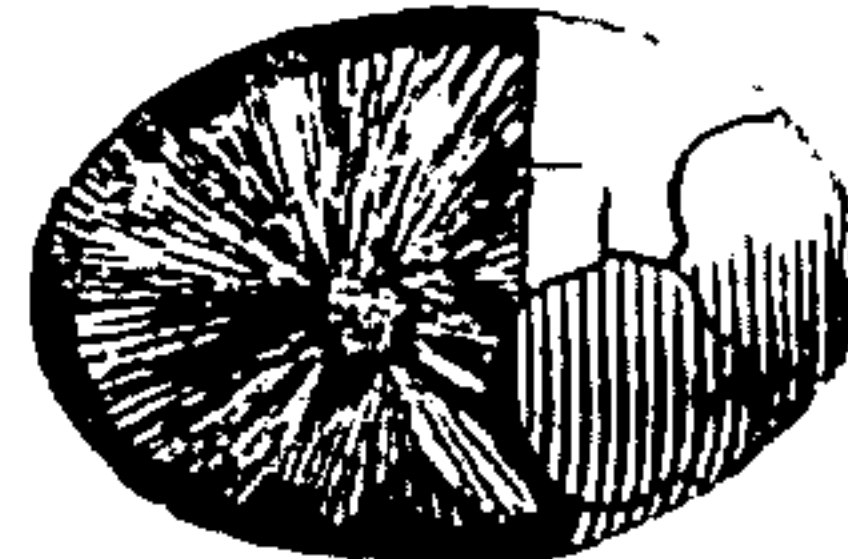
PYRICUBIUM



PYRITRICHIPHYLLUM



PYRITRICHUM



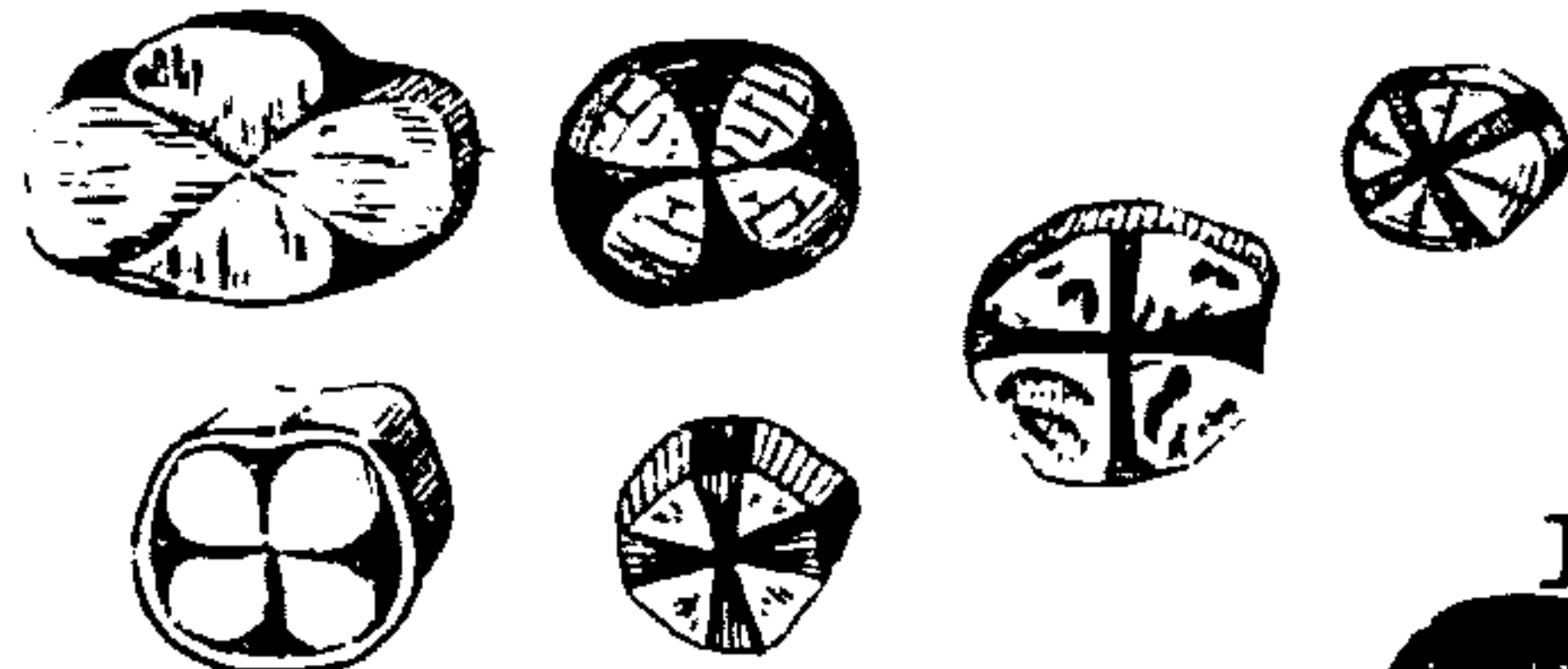
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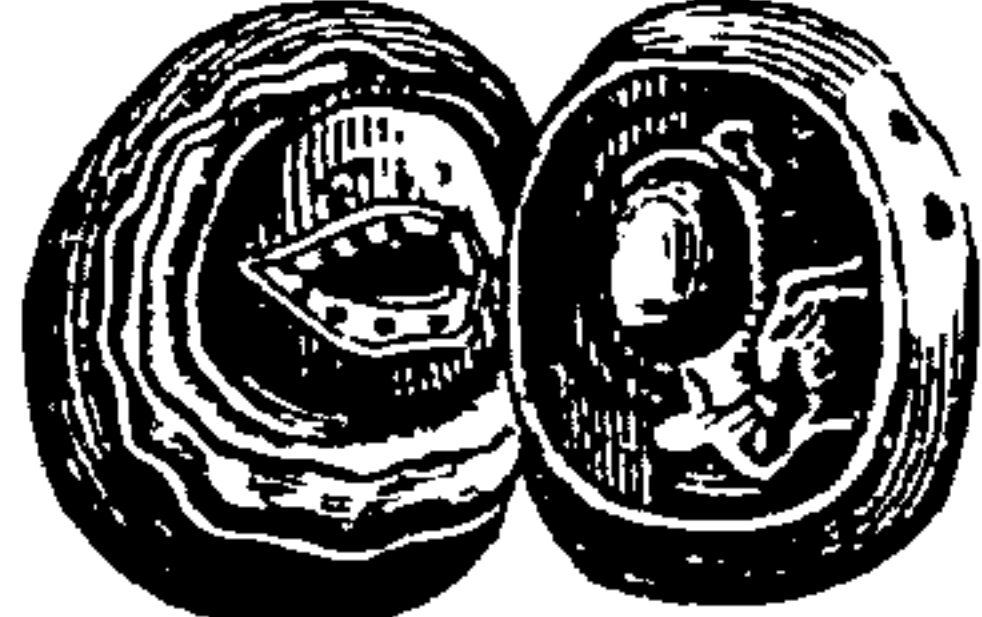
PYRIPLACIS



CROSS STONES



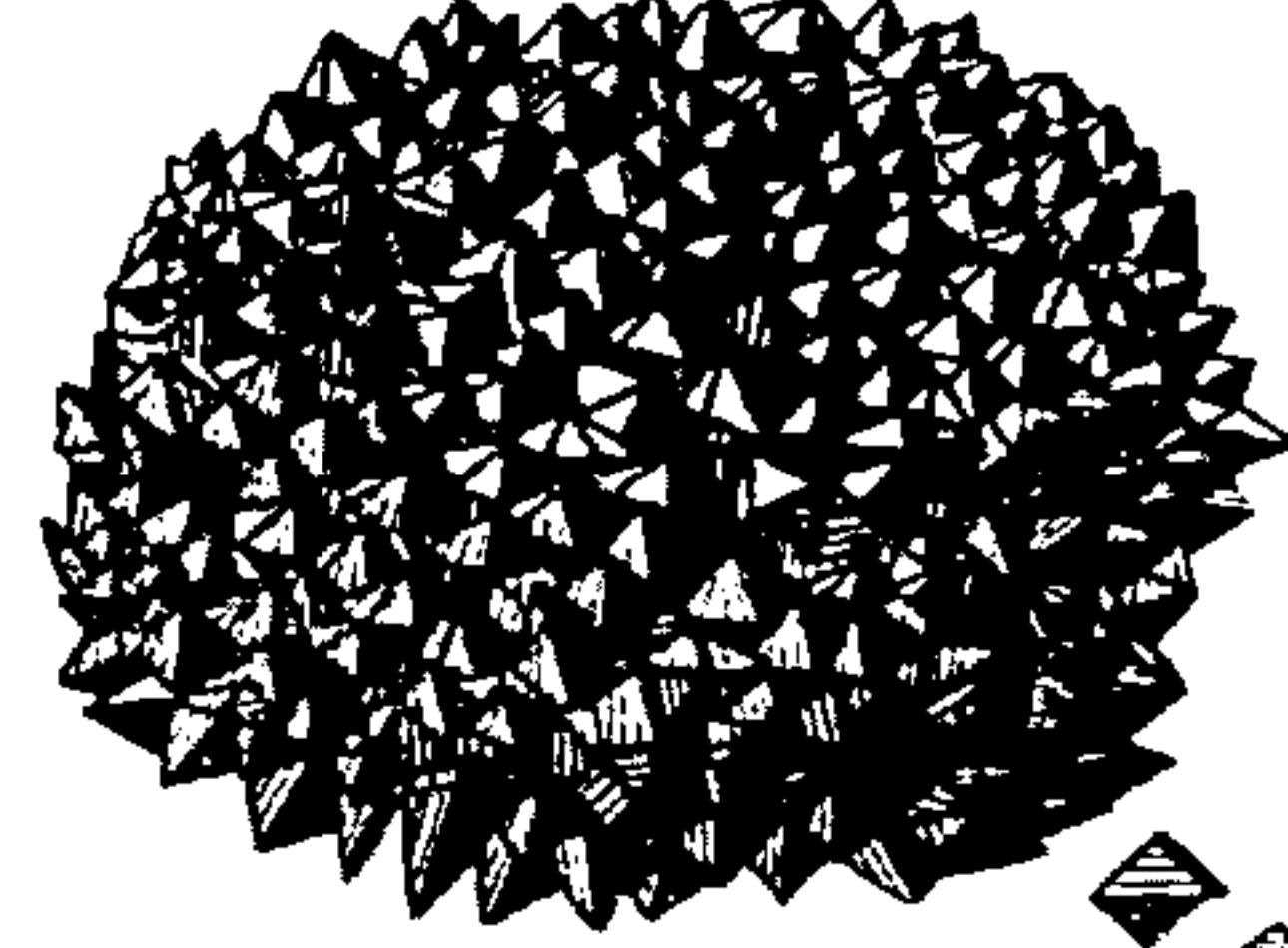
ÆTITES



PYRIPOLY GONIUM



PYROCTOGONIA



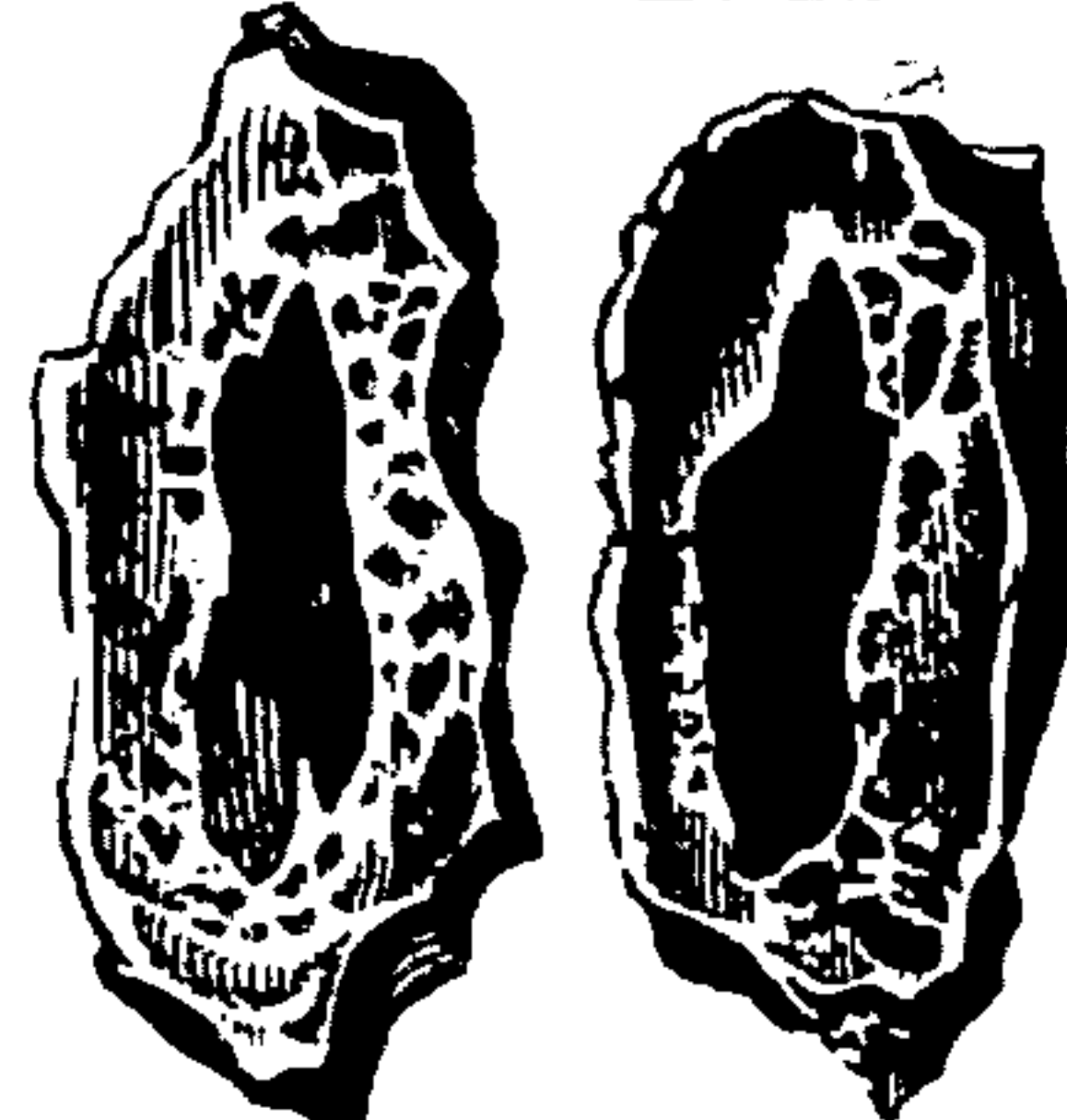
LEPIDOTES



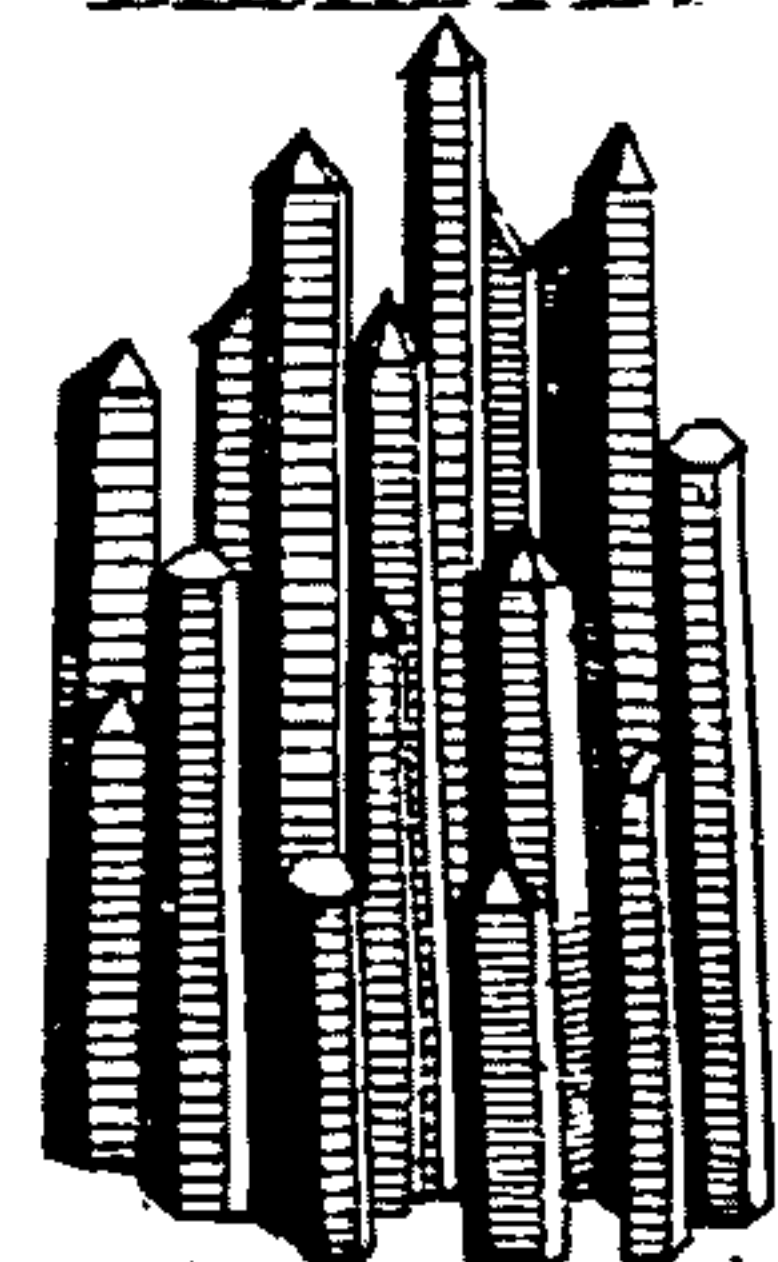
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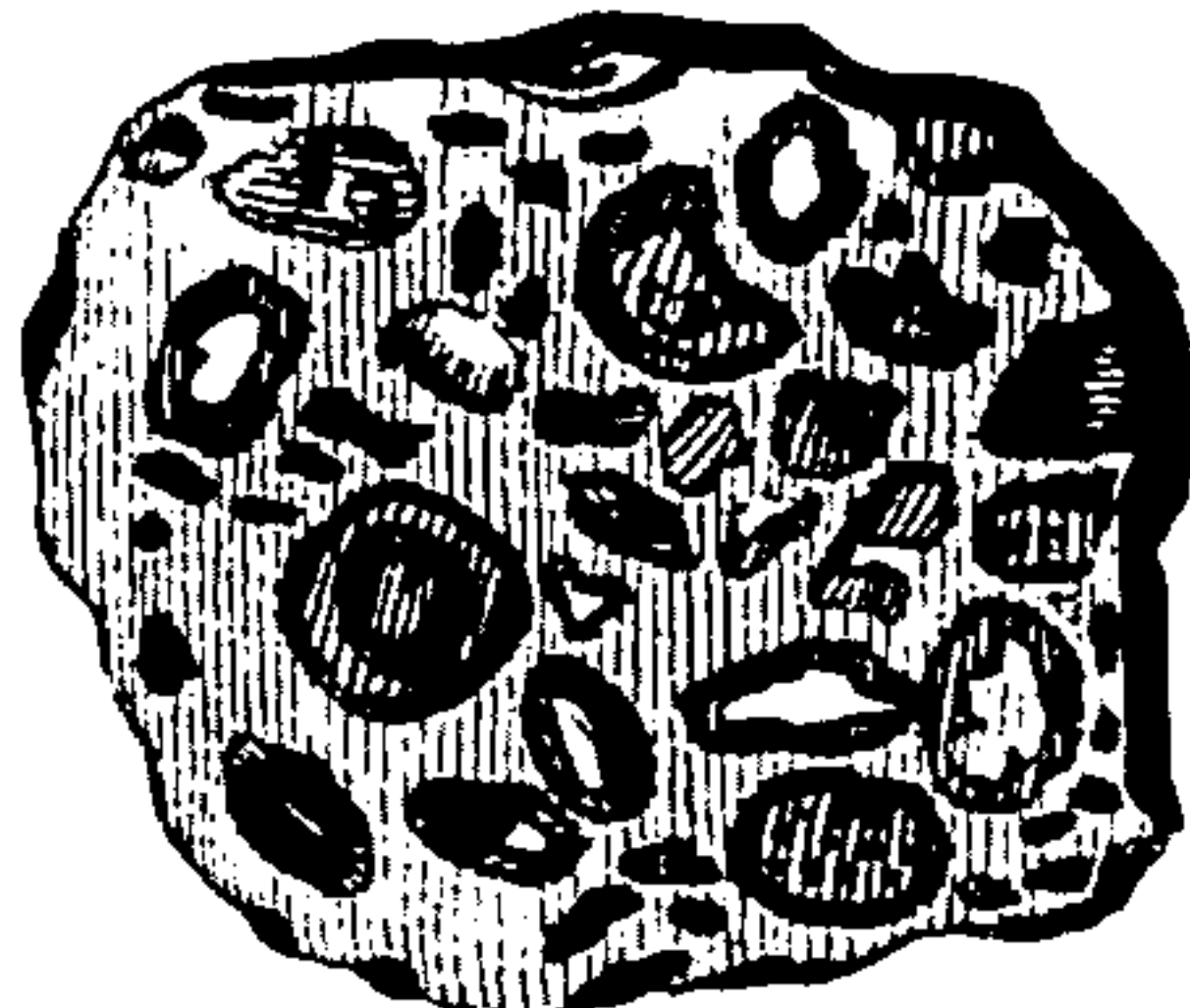
DENDRITIS



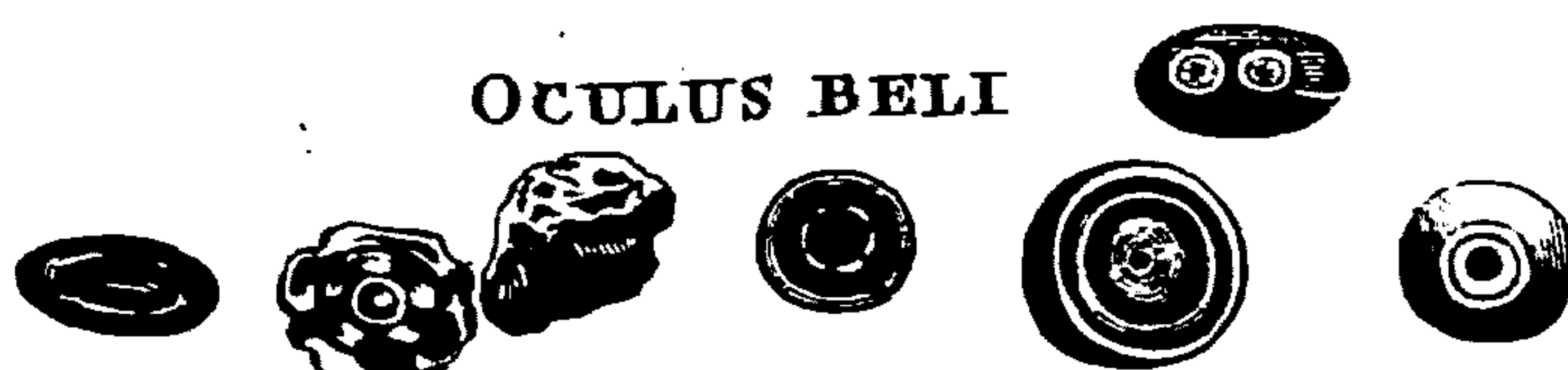
BASALTES



OCULATUS LAPIS



OCULUS BELI



Hard Greyish-white GYPSUM is found in masses about six or seven inches broad, and three thick, with very rough, rugged, uneven surface, and a coarse, dull, dead look; when broken it does not sparkle like the other kinds. It is common in Germany and Derbyshire.

Soft, Shining, Green GYPSUM is found in lumps four inches broad, and more than one thick. It is of a very dull, dusky brownish colour on the outside, but when broken is very glossy, though it seems to be a little spongy. It is very soft and brittle, and loses its fine colour before it is quite calcined in the fire. It is found on the shores of rivers in the East-Indies.

Soft White GYPSUM, commonly called Derbyshire plaster stone, is found in lumps from the size of an egg to two or three feet in diameter, which are opaque, and of a dusky brownish-white; but, when broken, pretty bright and glossy. It is of so soft and brittle a texture, that it will break with a small force. It becomes very white when calcined, and makes a very valuable plaster. It is found in many parts of Derbyshire.

Soft, Pale-brown, Glossy GYPSUM, is generally found in thin masses, seldom above a foot broad, and three inches thick, with a rough unequal surface; but, when broken, it has the appearance of marble, being extremely bright and glossy, and composed of very large broad particles. It is very soft and brittle, as most of this kind are, and readily calcines into a pure white plaster. It is found in some parts of Germany as well as in Derbyshire.

Soft Red GYPSUM is sometimes met with in small lumps, not much bigger than a walnut, at other times in masses of ten pounds weight, with a very rough, dull, unequal surface; when broken, it sparkles, but not very much. The texture seems to consist of different rows of short lines or streaks, variously intersecting each other. It is very brittle, and calcines very easily in the fire, making an excellent plaster. None of these Gypsums will ferment with aqua fortis, or strike fire with steel.

CHAP. XIII. Of the SELENITES.

THE Selenites are stones consisting of slender fibres, ranged in fine even flakes of different forms, according to their kinds. They will cleave like Talc, not only horizontally but perpendicularly; and though they will bend a little, they have no spring. They will not ferment with aqua fortis, nor readily calcine in the fire.

The Thin, Fine, Transparent SELENITE, with transverse streaks, is a common sort, and is met with from one tenth of an inch to five or six inches long. It consists of fine thin plates irregularly disposed through the whole breadth of the mass. These plates or flakes easily separate from each other in an horizontal direction, being almost as apt to cleave as Talc. It is pretty soft, and as void of colour as crystal; in the fire it turns to a pure opaque white. It is formed in the strata of clay in several parts of England.

The Thin, Dull, Opaque, Slender, Streaked SELENITE, is found from half an inch to three inches in length, and consists of a great number of even flat plates or flakes, each of which is of the same size as the horizontal surface. It is formed pretty much like the former, but not quite so regular, nor is the appearance so beautiful.

The Thin, Fine, Streaked SELENITE, with longitudinal streaks, is seldom broader than an inch, and above a seventh of an inch thick. It consists, like the former, of parallel horizontal plates; but

the fibres of which they consist, are slender, straight and exceeding regular, running in an oblique longitudinal direction, from one end of the stone to the other. It cleaves very easily, parting into flakes like Talc, and readily calcines to a fine white in the fire. It is found in the clay pit at Richmond, but at a considerable depth.

The Thick SELENITE, with transverse streaks and a rough surface, is usually met with of the size of about an inch and a half in breadth, and the plates and flakes, of which it consists, are remarkable for the largeness of the fibres that compose them, as well as the regular order in which they are laid. It calcines in the fire to a perfect whiteness, and is common in Yorkshire and Leicestershire.

The Short SELENITE, with thick plates, is of various sizes, but the most common is two inches in diameter. It consists of a smaller number of plates than others of this kind, because they are considerably thick, and are composed of bundles of fibres running longitudinally, and they are intersected with four or five transverse streaks. The whole stone is pretty bright and transparent. In the fire it turns to an opaque white, and is very common in the clay pits of Northamptonshire.

The Transparent SELENITE, with narrow transverse streaks, is generally between two and three inches long, and consists of very numerous horizontal plates, irregularly disposed, and of different thicknesses. They are composed of fine parallel straight fibres, running obliquely across the stone from side to side. It very easily cleaves into very fine flakes, and calcines in the fire to the whiteness of snow.

The Thick, Dull SELENITE, with very fine transverse fibres, is generally about two inches long, and consists of fine thin plates, evenly disposed, without the mass; these are made of exceeding fine slender filaments, running transversely in an oblique direction through the stone. The plates do not separate very easily, and the whole mass is dusky, being very little transparent. It is found in the clay pits in most parts of England.

The SELENITE, with fine longitudinal filaments, is composed, as well as the two former, of two horizontal, and two oblique planes. It is of various sizes, from a quarter of an inch to three inches in length. It calcines in the fire to a snow white substance, and is very common all over England.

The Brown Transparent SELENITE is generally three inches long, and consists of a greater number of fine, transparent, firm, parallel plates, joining exactly to each other. The plates consist of many fine filaments, all ranged in the same order, and not collected into separate bundles. It may be very readily cloven into horizontal plates that are very thin, and it calcines to a fine white in the fire. It is common in Germany.

The Thin Transparent SELENITE, with transverse fibres, is commonly about an inch long, and consists of many thin horizontal plates or flakes, made up of parallel fibres running obliquely across. It cleaves very easily, both horizontally and perpendicularly, and readily calcines into a white mass. It is common in Northamptonshire, and other parts of England.

The Dull, Thick SELENITE, with very thin transverse fibres, is generally between two and three inches long, and is composed of many extremely thin plates, that consist of an infinite number of parallel fibres that are connected into bundles, and run transversely in an oblique direction. It is very brittle, but it easily cleaves, according to the horizontal direction; and though it is as bright as the rest, it is not so transparent; but it calcines more readily to a perfect whiteness. It is found in Leicestershire in the yellow clay pits.

The Long Scaly SELENITE is commonly about three inches long, and has its horizontal plains very rough and scaly, it being composed of a vast number of oblong narrow plates, falling very irregularly one over another; it turns in the fire to a pure white.

The SELENITE, with thin flakes and transverse filaments, is generally about an inch in length, and is composed of six planes that are nearly equal; that is, a top, a bottom, and four sides. It is considerably long, in proportion to its thickness, and is composed of parallel plates lying evenly over each other in an horizontal direction, each making one whole surface of the stone. These consist of very fine slender fibres, laid obliquely across the flakes. It may be cloven very easily, according to the direction of the flakes; and in the fire it turns soon into a very pure white. It is sometimes found in Northamptonshire.

The Dull SELENITE, with thick plates and longitudinal fibres, is exactly of the same shape as the former, and is usually about two inches long, and a little more than a quarter of an inch in diameter. It is of an opaque whitish colour; but calcines very slowly to a fine white. It is common in clayey grounds in Yorkshire, lying near the surface.

The SELENITE, in the shape of a column, with very fine fibres, has six angles, and looks as if there was a part broken off at each end. There is no distinction of top and bottom, and all the planes are nearly alike. It is usually about an inch and a half long, and half an inch in diameter, consisting of a great number of very bright, and fine parallel filaments. It will cleave every way, but not into flakes, and the filaments are very flexible, but not elastick. It turns in the fire to a very pure white, and is found, but not commonly, in the clay pits of Northamptonshire.

The SELENITE, shaped like a column, with thick fibres, may be easily separated into filaments, for they will split off from many of its surfaces; but they will not bend readily, for they will easily break. They are neither bright nor transparent, but of a chalky whiteness, and turn to a pure white in the fire. It is found in the cliffs in the isle of Sheppy.

The Colourless Transparent SELENITE is of no regular shape, it being found in thin flat masses of different sizes and forms, that is, from one inch to a foot in length. It is composed of a vast number of minute and thin parallel flakes, not unlike Ising-glass. They are formed of a multitude of parallel fibres, ranged in a beautiful order. They are extremely bright and transparent, and the substance is very soft. It turns in the fire to fine pure white. It is found in several counties in England.

There is another SELENITE of this kind that is whitish and dull, but not so pure as the former; but it seems to be made up of plain even flakes, like those of Ising-glass. It is commonly long, in proportion to its breadth, but is a little thicker than the former. The sides are uneven and ridged, like the riling of a house; and it is of various sizes, being from one inch to six or eight long. It calcines slowly, but at length attains a perfect whiteness. It is common in Germany, and is sometimes met with in the strata of clay in Northamptonshire and Leicestershire.

The SELENITE, with eight sides, is always short and thick in proportion to its breadth, and is from one sixth of an inch to two inches long; but when it is only an inch, which is the common size, it is about half an inch thick and broad. It is composed of a vast number of pretty thin plates, laid evenly and regularly in a transverse order, and these consist of moderately large fibres. The flakes are very flexible, but not elastick, and they are all

opaque and whitish while together. It is found in the clay pits of Staffordshire.

The SELENITE, composed of filaments that are ranged toward the surface of the body, into broader plates, which are notched at the edges, and seem to be radiated in the form of a star, is bright, and of a brownish white, and seems to be composed of fine thin plates, propagated from a single point, which is seldom placed in the centre of the mass, and the whole variously jagged. The stars are usually broad and flat, having but little thickness in proportion to their extent. This stone is of various sizes, namely, from that of a barley-corn to two inches in diameter. When broken it seems to be composed of straight, even, and very fine slender longitudinal fibres, proceeding from the centre, and form a mass of a very beautiful streaked texture. In the fire it turns perfectly white, and is found in the isle of Sheppy.

There are other species of the Selenite; but those we have already mentioned are fully sufficient.

CHAP. XIV. Of CRYSTAL.

CRYSTAL is a soft transparent gem, that has somewhat the appearance of frozen water, and is sometimes like an hexagon column pointed at each end; or rather seems to be composed of two hexagon pyramids with a column placed between them.

It is the softest of all gems, and when it is coloured goes by another name, though it ought not to be substituted in the room of the more precious sorts of stones. When it imitates a Beryl, it is called a bastard Topaz, and the like.

Crystals, with a long intermediate column, are, the very bright CRYSTAL without any colour, which seems to be the most perfect kind, and is generally free from all kinds of blemish. It is pointed, as mentioned above, and consequently consists of sixteen planes or sides in all; but those on the pyramids are not of an equal breadth, two of them being narrower than the rest. It is found from the size of a barley-corn to three inches long, but the common size is an inch. It does not depend upon any other body; but where one is met with there are generally more. It is moderately heavy, will strike fire with steel, and when calcined, is of an opaque white. It is commonly met with in the mountains of Germany, but is very rare in England.

Blackish Bright CRYSTAL, with short pyramids, is always pure and without clouds. It is of various sizes, and is most commonly three quarters of an inch in length. The number of sides is the same as in the former. It is harder than common Crystal, and cannot be broken without difficulty. It is remarkably bright and transparent, and has what they call a black water. It is very uncommon, though it is sometimes found among other sorts in some parts of Italy.

Dull Whitish CRYSTAL, with irregular pyramids, has a longish and pretty thick column, and the pyramids are longer in some parts than in others. It is seldom quite an inch long, and is near half an inch in diameter. It will strike fire with steel, and calcines easily into a pure white. It is common in Germany, and is sometimes found in Yorkshire and Cornwall.

British colourless CRYSTAL, with long pyramids, and a short column, is very bright and transparent, and the thick short column has long pyramids tapering at the end. It is usually about an inch and a half long, and three quarters of an inch thick.

thick. The planes are seldom regular, but four on the column and pyramid are frequently broader than the other two. It is so hard as not to be scratched, and is not easily broken: When calcined, which it is with difficulty, it is as white as snow. It is found in Bohemia.

Bright Brown CRYSTAL, with short pyramids, and a very short column, is always thicker than it is long, and is seldom or never either cloudy or foul; it is of various lengths, from the third part of an inch to three inches, and the diameter is always greater than the length. It is generally found in large parcels in the same place, and is extremely hard, breaking with difficulty, and in any direction; when calcined, it becomes perfectly white.

Yellow Bright CRYSTAL, with regular pyramids, and a short column, is seldom pure, there being cloudy spots, films and streaks therein; it is composed of eighteen sides or planes, like the rest; that is, six on each pyramid, and six on the column, and is found from a quarter of an inch to two in length. It is considerably hard, strikes fire with steel, and when calcined is entirely white. It is common in Silesia and Bohemia, and has been sometimes found in Yorkshire.

Bright Colourless CRYSTAL, with a short column gibbous in the middle, is a very fine sort, and has moderately long and sharp pyramids at the end; it is three quarters of an inch long, and a quarter and a half in diameter, and is found single, though sometimes it is met with among the strata of stones. It is very hard, strikes fire with steel, and calcines to the whiteness of snow.

Dull CRYSTAL, with large pyramids, and an extremely short depressed column, is a very foul opaque sort, and of a coarse texture, with a continual cloud throughout its whole substance. It almost entirely consists of pyramids without a column, and is found detached from all other bodies, but commonly in considerable numbers. It is not so hard as common Crystal, but will strike fire with steel, though not easily; and is very white when calcined. It is seldom or never found in England.

Small, Bright, Blackish CRYSTAL, with regular pyramids, is extremely clear and regularly formed; it is of various sizes, the largest among them not exceeding a sixth of an inch in length, but many are extremely small. It is very hard, and is calcined with difficulty. It is found in Germany in the cavities of a black fissile stone.

White CRYSTAL, consisting only of two pyramids, which are short, and joined base to base, is generally very pure, and is always found independent of all other bodies. It is not perfectly colourless, it being a little whitish; but it strikes fire with steel very freely, and calcines very slowly.

Brown CRYSTAL, consisting of two long pyramids, without a column, is perfectly pure, and regularly formed, and is of different sizes, from the eighth of an inch to three inches in length, and one third of its length in diameter. It is seldom found single, many of them being usually joined together in an irregular manner; and, when not joined, they are always pretty numerous. It is of a very fine water, and extremely hard, striking fire with steel, and calcining slowly to a perfect whiteness. It is found in Scotland on the sides of hills, and sometimes on the banks of rivers.

Crooked or Slanting CRYSTAL, consisting of two pyramids, without a column, is perfectly pure and transparent, and consists of an oblique, or slanting double pointed body, besides the pyramids being irregular. It is from a quarter of an inch to two inches long, and about three fourths of its length in diameter. It is of a very fine water, and is extremely hard, striking fire readily with steel. It is

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found in the East and West Indies, and is common in New Spain, where it is highly valued.

Bright Blackish CRYSTAL, consisting of two very short pyramids, without a column, is a very fine sort, and appears as bright as any stone of this kind. The two pyramids join evenly base to base, though sometimes one is a little larger than the other. It is commonly found in lumps, consisting of several of these Crystals pretty close together; however, at other times, they are loose and independent of each other. It has a fine blackish hue, and is very bright, with a fine water. It is extremely hard, strikes fire with steel, and after a long calcination becomes white. It is found in Italy, Germany and France.

CRYSTAL, consisting of two pyramids only, with eight sides each, that is, having sixteen planes in all, and of a brownish colour, is of a very uncommon kind; it is fine and clear, though often spotted with large blotches of black. The pyramids are much of the same length, and the planes are extremely smooth; sometimes a hundred, or upwards, are found together, but detached from each other. It is considerably hard, strikes fire with steel, and calcines to a pure white. It is found in Virginia, on the sides of hills, among a sort of iron ore.

CRYSTAL without colour, consisting of two longish pyramids, with eight sides each, is a very pure sort, and very fine and clear; it is usually near an inch long, and a third of an inch in diameter, with the planes entirely smooth polished and even. It is usually found single, is very transparent, and of a very fine water, as well as extremely hard. It is exceedingly scarce, and, as yet, has been found only at Gofslear in Saxony.

CHAP. XV.

Of Imperfect CRYSTALS:

SPRIG CRYSTAL is whitish and transparent, and has only one pyramid with six angles, besides the column; it is an exceeding common sort, and is very regularly formed, though it is subject to variety of blemishes. The column is always long and slender, and fixed at one end to some solid Fossil, consequently the hexangular pyramid must be at the other end. The length is from a tenth of an inch to ten inches and longer; the planes are irregular, as to length and breadth, and they differ so much from each other, that scarce any two of these Crystals are found exactly alike. They are, almost always, found in clusters, are very hard, strike fire with steel, and calcine after some time, to a pure white.

Bright imperfect CRYSTAL, without a tinge of any colour, is, by many, confounded with the former; but it is different from it, and is often sold by dealers for a white sapphire, because it is somewhat like it; it is perfectly clear; generally pretty regular, and has a long slender column with six angles, terminated by a pretty long hexangular pyramid; it is from one tenth of an inch to three or four inches long; but it is most commonly about an inch and a half. It is not found in such large clusters as the former, but is extremely hard, strikes fire with steel, and calcines very slowly to a pure white. It is found in the East and West Indies, as well as in Germany; sometimes it is so tinged as to imitate gems, and may be readily mistaken for them.

Dull Whitish imperfect CRYSTAL, with a very short pyramid, is remarkably coarse and impure, not with having films or clouds, but by being whitish throughout its whole substance; it consists of the same planes as the former, and is usually long in

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proportion

proportion to its thickness in the column; but the pyramid is always short. It is met with from a quarter of an inch to four inches long, and is generally found in large clusters; but it is not so hard as most of the rest; for it will not readily strike fire with steel, and yet it calcines slowly to a pure white. It is found in most parts of Europe, and particularly in Cornwall.

Bright Brown imperfect CRYSTAL, with a long pyramid, is generally known by the name of brown Crystal, and has a very fine clear texture. The form is generally regular, it having a long and pretty thick column, and is found from the size of an inch to an inch and a half in length, though some have been met with ten inches long. It is extremely hard, strikes fire with steel, and calcines, at length, to a pure white. It is found in the East and West Indies, as also in Silesia and Bohemia, as well as in the islands of Scotland.

Dull Brown imperfect CRYSTAL, with a short pyramid, is sometimes mistaken for the former, though it is not near so good, it having a dull and dead aspect. The column is regular, but always slender in proportion to its length, and is from half an inch to fourteen inches long. It is commonly found in clusters, but the columns do not adhere to each other, as in the former; and its brown colour is of various degrees, for some are pale, and others almost black. It is tolerably hard, strikes fire with steel, but will not readily calcine. It is very common in Germany, and is found in the cliffs of rocks.

Bright Brown imperfect CRYSTAL, with a short pyramid, is often tinged with various colours, but most frequently with a pale yellow; it is extremely pure, and of a bright fine texture, though often covered with a rough coat. The column is long and slender, and it is generally met with about two inches long, and not quite half an inch in diameter, but the planes are irregular; it is commonly found single, though sometimes in large clusters, and is extremely hard; it strikes fire with steel, and, after a considerable time, calcines to a pure white. It is found in the great mine at Gosslear in Saxony; as also in Virginia.

Bright Brown imperfect CRYSTAL, with a very long irregular pyramid, is called the Beryl by some jewellers, and has the greatest lustre of all the brown Crystals; but it is not very large, being only from half an inch to four inches long, and has a thinner column than others of the same length. The planes are the same in number as in others; it is very hard, strikes fire readily with steel, and calcines very slowly. It is found in Italy and Germany, and is commonly called by the jewellers, the Beryl Crystal.

Whitish imperfect CRYSTAL, with a very long pyramid, is, by some authors, called the Iris or Rainbow Crystal; it is remarkable for reflecting different colours, whence it has its name. It is not very pure, for sometimes there are large white flaky blemishes, but the form is perfect and regular; it is usually long and slender, and most commonly about three inches long. It is often met with in clusters of forty or fifty together; but the columns singly touch each other; it is pretty heavy, strikes fire with steel, and in the fire readily calcines and turns white.

Bright Yellow imperfect CRYSTAL, with a short pyramid, called Citrino by the jewellers, is very clear, pure, and of a fine texture, it being generally free from blemishes, and is from one to five inches in length; but commonly much thinner at the top than near the root. It is mostly found single, and is of a very beautiful yellow; it is not extremely hard, but it will strike fire readily with steel, and calcines slowly to a whiteness in the fire. It is found in Bohemia and the West Indies, and is made use of for stones to set in rings.

Short, Bright imperfect CRYSTAL, without any colour, may be distinguished from all others, by being very short in proportion to its thickness; it is almost always extremely pure and without blemish, and its figure has little variation. It is always fixed to some body or other, and is found of various sizes, from half an inch to three inches long, and the diameter is commonly two thirds of the length. A cluster of eight or ten of these is generally found together, but the columns seldom touch, and never adhere. It is remarkably hard, and will admit of a fine polish. It is found in New Spain, and other parts of America.

Brown imperfect CRYSTAL, with a rough coat, and five planes on the pyramid, as well as on the column, has a coarse and opaque coat, but the inside is never subject to any foulness. The column is thick and short, and the pyramid pretty long and slender; the most common size is three inches long, and near an inch and an half in diameter, and there are two broad planes on the pyramid, as well as on the column. The root is very small and inconsiderable; and it is usually found single, of a very beautiful brown, extremely transparent; and of a fine deep water. It is very hard, and calcines slowly to a pure white. It is found in the East Indies, and is in high esteem among the jewellers, it being the finest of all brown Crystals.

Brownish-white imperfect CRYSTAL, with a long pyramid, has twenty-four planes; that is, twelve on the pyramid, and twelve on the column. The texture is pretty fine, pure, and clear, though sometimes subject to foulness from flakes. It has a regular, pretty long and slender column, and is about three inches long, and little more than half an inch thick. The planes are all irregular with regard to breadth, and sometimes there is a part of them wanting. The root of this kind is long, large and whitish, and is usually found single. It is very hard, and calcines slowly into a perfect whiteness. It is found in the mountains of Silesia and Bohemia, as well as on the shores of rivers, and is in high esteem.

Yellowish-Brown imperfect CRYSTAL, with a short pyramid, having twelve planes on the pyramid, and as many on the column, is of a pure, perfectly fine sort, and is seldom subject to blemishes, though there are sometimes found very small flakes of a whiter substance. The column is long and slender, and the usual size is about an inch in length. The planes are very irregular, with regard to breadth, and the pyramidal planes differ greatly in length as well as in breadth. It is extremely hard, and will calcine at length to a pure white. It is usually brought over with the Saxon topazes.

Clear Colourless imperfect CRYSTAL, with a very short pyramid, and twelve planes on the pyramid, as well as on the column, is extremely clear, pure, and of a very fine texture, without the least spot or blemish. It is from one to two inches long, and some of the plains are broader than the rest. The surfaces of those on the pyramid are perfectly smooth, and those on the columns have deep ridges. It is commonly found single, is perfectly transparent, and has a fine bright water. It is remarkably hard, and is found in the East Indies.

Colourless, very Bright, imperfect CRYSTAL, with a pretty long pyramid, which has twelve planes, and the column as many, is generally found in clusters, and is a pure, elegant, regularly formed Crystal, though generally very small, it being not above an eighth part of an inch in length, though it has been found half an inch long or upwards. The planes seem to be nearly all of a breadth, and of the same length, and the top of the pyramid stands over the centre of the column; the planes of the pyramid are always smooth, having a high natural polish, and a fine

fine lively dark water. It is extremely hard, and is found in all parts of this kingdom, sometimes surrounding a single or double round ball, and at other times in the cracks, cavities, and clefts of flints, and other stones.

Blackish imperfect CRYSTAL, with very short pyramids, with twelve planes thereon, and as many on the base, is thought to be the hardest and brightest of all the class. The column is somewhat longer, and the pyramid shorter, than in others of this kind. It is so extremely small as sometimes not to be discovered, unless by its glittering, though there are some the tenth part of an inch in length, and a few the third of an inch. It is shaped like the former, and has naturally a very fine polish; it is extremely hard, and is found in great plenty in the forest of Dean in Gloucestershire.

Imperfect CRYSTAL, with a blunt pyramid, and a very short column, each of which has twelve planes, is pretty pure and clean, though sometimes subject to spots and white opaque flakes. The pyramid is blunt, broad, and fixed to a broad short column, that sometimes seems to the naked eye to be wanting. It is extremely small, the usual size being not above the twelfth of an inch in length, and nearly of the same diameter. There are various sizes in the same mass, there being small ones between the larger; but the surfaces are very smooth and pretty glossy. It is found together in large quantities, and is sometimes tinged with red or yellow. It is considerably hard and heavy, and found in Cornwall, Yorkshire, and other counties of England.

Whitish Transparent imperfect CRYSTAL is somewhat like the common Crystal, and, at first sight, seems to have the same number of planes. It is pretty fine and pure, and is of a perfect regular form, being in the shape of a pyramid with four sides, and is pretty broad at the bottom. It is generally about half an inch high, and almost as much in diameter; but there are some two inches high. However, it is often met with in large clusters, and the largest single Crystal is no bigger than a grain of barley. When it is found single, it always adheres to some fossil body at the base, and is principally met with in Devonshire and Cornwall.

Colourless, Transparent, imperfect CRYSTAL, consisting of six planes, is perfectly pure, fine, clear, and broad in proportion to its length. It is very small, being generally of the size of a grain of Wheat, and the largest is seldom more than the third of an inch in length. It is but thin in proportion to the size, and sometimes all the planes are perfectly smooth, and sometimes with ridges, appearing streaked near the extremities. It is sometimes found single and loose, and at other times in clusters that hurt each other. It is extremely heavy, very hard, and is found in pretty large quantities among the iron ores of the forest of Dean.

Black, Glossy, imperfect CRYSTAL, of a rhomboidal form, is extremely pure, and of a very regular shape. It is from a third of an inch to an inch in length, and is bright, smooth and glossy. The larger sort is usually single, and the small are in larger masses, of a fine blackish colour, and calcines to a fine purplish red. It is met with on the surfaces of the perpendicular cliffs, in the iron mines of Gloucestershire. There are many other sorts of crystals; but to enumerate them all would be tedious and useless.

CHAP. XVI.

Of SPARS, of various Figures and Shapes.

SPAR, with a narrow oblong pyramid, is very like Crystal with eight sides, and is of a pure

fine texture, it being the most perfect of all the whole class, having a column with single angles, with a pyramid, consisting of the same number. The column is pretty long, but not thick, and the pyramids are remarkably slender and pointed. The common size is the twelfth of an inch long, though some have been seen of three quarters of an inch. The larger specimens are generally found loose; but they are most commonly among the coarser strata of stones, and is sometimes tinged with a faint purple colour. It will not strike fire with steel, but will dissolve in aqua fortis, and will calcine easily in a moderate fire. It is found in the mountains of Germany, and in North Wales.

SPAR, with very short pyramids and a long column, is perfectly pure, and a regularly formed body, consisting of a pretty long and thick hexangular column, terminated by a very short pyramid with the same number of sides. It is commonly about an inch long, and the third of an inch in diameter. It will not strike fire with steel, but will ferment with aqua fortis, as will indeed every kind of Spar, and therefore this needs not be repeated. It is found in Saxony, and sometimes in Hartz forest.

SPAR, with short pyramids, and a very short column, may easily be distinguished from others by its shape, and is of a pretty pure and fine texture, but not so clear as the former. It is generally found in clusters of eight, ten, and twelve together, and has a dusky hue, with very little transparency.

SPAR, with very short and broad pyramids, is extremely pure, and of a perfect fine texture, having a pretty long and thick column, with a depressed pyramid at each end, each of which has five sides. It is sometimes met with an inch long, but the commonest sort is exceeding small, and is lodged in the strata of clay. It is found in Derbyshire, Yorkshire, and Cornwall.

SPAR, with long pyramids and a long column, which consist each of three sides, is pretty pure, but has a whitish cast and a dullish look. It is commonly about an inch in length, and half an inch in diameter. It is considerably heavy, but very soft and easily scratched. It is found in Germany, and sometimes in Cornwall and Devonshire.

Slender SPAR, with very short pyramids, consisting of three sides as well as the column, is generally pretty pure, and of a fine texture, though sometimes subject to blemishes. The common size is three quarters of an inch in length, and is of a bluish white, but sometimes approaching to a lead colour, or a yellowish brown. It is very soft, and is found in England, Ireland, and Germany.

SPAR, consisting of two long pyramids without a column, each having eight sides, is very pure and fine, and commonly about three quarters of an inch long. It is very transparent, though it is somewhat of a whitish colour.

SPAR, with short and sharp pointed pyramids, each consisting of eight sides and without a column, is very pure, and is remarkable for its short points and broad basis, and is often found half an inch thick, but never longer than two thirds of its thickness. This, as well as the former, is found in Hartz forest, in Germany.

SPAR, with long narrow sharp pointed pyramids, consisting of six sides each, and without a column, is generally fine, clear and pure, though sometimes cloudy. It is often an inch in length, but not a third of an inch in diameter, and is very soft. It is found in the mines of Mendip hills.

SPAR, with short broad pyramids consisting of three sides each, and without a column, is very pure, fine, and clear, and is very short in proportion to its thickness. It is from half an inch to an inch and a half long, with very smooth glossy planes. It is pretty transparent, and brighter than most other Spars,

Spars, as well as harder, though it will not strike fire with steel. It is found in Hartz forest.

Slender SPAR, with a long pyramid, consisting of six sides, has often been mistaken for a Crystal, it having a long slender hexangular column. The texture is extremely fine, though it is sometimes subject to flaky flaws, and is commonly two inches long, and a third of an inch in diameter. It is not so bright as Crystal, and is sometimes of other colours, which are very lively and beautiful like gems; but it is soft, and found in Mendip hills.

SPAR, with a very short pyramid, consisting of six sides as well as the column, is generally very pure and clear, though sometimes blemished, and the common size is about an inch and a half. It is naturally of a greyish white, very transparent, and pretty bright; however, it is sometimes tinged with other colours. It is very soft, and found in the mines of Derbyshire.

SPAR, with a very long pyramid, consisting of five sides as well as the column, always adheres to some solid body, and is of a clear fine texture. It is seldom more than a quarter of an inch thick, and the third part of its length high. It appears very smooth and glossy, and looks like Crystal, though it is sometimes tinged with other colours. It is pretty hard, and is found in Mendip hills.

Hard transparent SPAR, of the shape of a parallelepiped, commonly called Iceland Crystal, is extremely pure, clear and fine, and is found of various sizes from a quarter of an inch to three inches in diameter; but its usual size is two inches and a half. It seems to be smooth and even at first sight, though if nicely examined ridges will be found upon it; it is almost as transparent as fine Crystal, but is very soft, and generally found single. It is found in Iceland, as also in Germany and France; it consists of plates laid one upon another, and will cleave in the manner of Talc; and when it is reduced to powder it still retains its rhomboidal figure, which may be discovered by a microscope. It has this singular property, that all objects appear double through it, which is owing to the double refraction of the rays of light.

Milk-White Opaque Shattery SPAR has a pretty fine and perfectly equal texture; but has no determinate shape, and is found from an inch to a foot in diameter, with a rough irregular ragged surface; it is sometimes a little brownish, and sometimes inclining to a dusky red, and is pretty hard. It is found in France and Germany, and in some of the cliffs of the Welch coasts, as well as in Yorkshire and Scotland.

Hard, Grey, Transparent SPAR, is of a pure equal texture, and has the appearance of Crystal, though it is sometimes tinged with the colour of gems. It has usually the figure of common flints with very uneven surfaces, and the size is from two inches to six or eight in diameter; it is frequently tinged with green, and sometimes with yellow. It is pretty hard, and is found in the lead mines of Scotland, and in other places.

Transparent, Colourless, Shattery SPAR, is nearly like Crystal, and is of a pure, fine, regular texture; but it has no determinate figure, being found of various shapes and sizes, that is, from half an inch to five inches in diameter; it is dark on the outside, but when broken is extremely bright and glossy, and with a small blow it will fall into many rhomboidal thick masses. It is not very hard, and is found in Hartz forest.

Naturalists divide Spar into innumerable other classes; but, after the Reader is well acquainted with such as we have here mentioned, he will easily distinguish those of an inferior sort, without being burthened with a long account of them in print.

C H A P. XVII.

Of Crustated SPARS debased with Earth.

HARD, Semi-Transparent, Yellowish-Brown SPAR, has an equal regular texture, though not very fine, and the earth is regularly diffused throughout. It always conforms to the shape of the substance to which it is joined, and consists of a thin crust extended over flat, round, and irregular surfaces. It is from the twentieth part, to the third part of an inch thick, and is from a few inches, to many feet in breadth. It is very soft, and is found in many parts of England.

Brittle, Transparent, Whitish SPAR, is of a pretty pure fine texture, though sometimes transversely streaked with earth, rendering it red, yellow, brown or black; it is formed like a crust, and is sometimes flat. It is found on the sides of the perpendicular clefts of the mines in Germany, and the caverns of Mendip hills.

Hard, Whitish-Brown, Dusky SPAR, is foul and impure, though of a regular texture: it is extended over various bodies in the form of a crust, and is from an inch and a half broad to five or six feet. It is pretty hard, and is found in Hartz forest, as well as in the lead mines on Mendip hills.

Dull, Pale-Brown, Brittle, Coarse SPAR, is the most common of all the crustaceous Spars, and is very coarse, impure and earthy, being often tinged with various colours, by the different earths it is blended with. It is of no certain size, and it conforms to the shape of the mass to which it gives a coat. It has a pretty even surface, the wrinkles being never deep; and, when broken, it is of an irregular texture. It will readily crumble between the fingers, and is found as well on the inside of pipes for water, as in tea-kettles.

White, Light, Brittle, Earthy SPAR, is the coarsest of any of this kind, and the whole mass is light, loose and brittle; for some of this kind will not bear touching without crumbling to pieces. It has very luxuriant efflorescences on its surface, and more than any of these bodies. It is met with in various places.

Light, Hard, Pale-Brown, Earthy SPAR, with a smooth surface, often incrusts round moss, for which reason some have taken it for petrified moss. It is of an equal uniform structure, but foul, and always assumes the shape of the body it is formed upon. It is pretty hard for an earthy Spar, and is found in all parts of the world.

Whitish, Brittle, Crustaceous Earthy SPAR, with a rough surface, is of a very coarse, foul, impure texture, and of an earthy colour. It is always of the shape of the thing it incrusts, being sometimes met with on small stones, branches of moss and the like. It is of a dull whitish colour, without the least brightness, and is very soft and brittle. It is found in the subterraneous caves of various countries.

Hard, Pale-Brown, Thick, Rough, Earthy SPAR, which is the osteocolla of the shops, is of a very coarse, foul and impure texture, having the appearance of hardened marl. It is always found in long, thick, irregular, cylindrical pieces, usually hollow, and sometimes filled up with a softer substance. The surface is always rough and deeply wrinkled, being without the least brightness. It is very hard, and is found in many parts of Germany. It has formerly been much esteemed as a medicine, though it is now out of use.

Whitish-Grey, Brittle, Earthy SPAR, with a smooth surface, by some called the Fossil Unicorn, and by others Stone Marl, is of a stony substance, and in colour, smoothness, and form, represents the horns, teeth or bones of animals; but sometimes it is softer, with a hard yellowish, blackish, or ash coloured

coloured crust, while it is soft and brittle in the inside. This has an astringent taste, and adheres firmly to the tongue. It is frequently dug up in pieces resembling bones that are petrified; among which are the teeth called grinders and incisors, which are extremely large, to which there is a root plainly connected. Sometimes they look like the fragments of bones of the arms and legs; and sometimes they appear like the branches and trunks of trees turned into stone. They are found in various parts of Germany, as also in a hill near Paris, where they appeared to be real bones, covered over with a stony substance. It is commended by the Germans for being an astringent, promoting sweat, and for stopping bleedings and loosenesses. It is given in the epilepsy from half a scruple to a drachm.

Whitish-Brown, Tuberosc, Unequal SPAR, in the shape of coral, is of a pretty fine texture, and contains less earth than others of this kind. It is commonly in the shape of a small oblong cylinder, with a pretty even surface, though it has often several branches like the coarser white fossil corals. It is about two inches and a half long, and the third of an inch in diameter; when broken, it is firm, solid and compact. It is found lodged in the strata of yellow clay, and is very common in France and Germany; it is also met with near London.

Hard, White, Oblong, Conical SPAR, is extremely pure, and is as crystalline as any Spar whatever. It has the appearance of an icicle, broad at the base, and tapering towards the point; and its natural place is the arched roof of a subterraneous cavern. It is found from an inch to fifteen inches in length, and is sometimes perfectly round. These Spars are formed by water dropping from the roof of these caverns; and consequently it is often met with in a petrified state on the ground formed into various shapes; we have a remarkable instance of this in Pool's-Hole in Derbyshire, which is considered as one of the wonders of the Peak.

There are also other Spars of various colours, which are found hanging to the roofs of caverns; but which, in reality, differ very little in their nature from the former.

CHAP. XVIII. Of SALT S.

FOSSILE SALT, commonly called Sal-Gem, is of several kinds; it is almost as transparent as Crystal, and is sometimes as white as snow, at others grey, red or yellow. When dissolved in water and crystallized, by evaporating the moisture, it becomes of a perfect cubical shape. It is called Sal-Gem, because it has some resemblance to stones of that kind; but it may be readily distinguished from them, by applying it to the tongue. There are large rocks of this kind in different parts of the world, particularly in Spain near the river Ebro, and there is one of a purple colour in Portugal, and in Poland and Russia there are several. It is pretended in Spain, that it grows as fast as it is taken away; however, it is certain, the mine has been opened five hundred years. In Poland, six miles from Cracow, they hew the Salt out of the mountain, in the same manner as they do stone, in very large pieces. It has the same virtues as common Salt, and is used as well for clysters as suppositories to evacuate the hard excrements. But this must never be used where there is an inflammation of the intestines.

Common SALT is either made with sea-water, salt springs, or wells, by the heat of the sun, or by boiling. In some places they dig pits near the sea, and line them with clay; they afterwards fill them with sea-water at high tides, and the water being

exhaled by the heat of the sun, there is left plenty of Salt at the bottom. In Neustria, that is, in the western parts of France, they heap up the sand on the sea-shore, on which they pour sea-water often, and after the moisture has been exhaled by the heat of the sun, the salt is left behind. When there is a sufficient quantity, they boil it in fresh water, and then strain it off into leaden vessels, when they boil it again till it is become of a proper thickness; after which they remove the fire, and suffer it to coagulate into whitish crystals of Salt. They make Salt from salt springs much in the same manner, though there is a particular art in causing it to granulate; for some mix bullocks blood therewith, to cause a quicker separation of the Salt from the bittern. This likewise frees it from the bituminous and earthy particles mixed with the Salt, which are either carried off in froth, or remain in the bottom of the pans. But that is the best Salt which is made with lakes of sea-water, by the heat of the sun, because that which is made by fire has generally somewhat of bitterness. That made with the water of salt springs or wells is most pungent, on account of the alkalious mineral Salt mixed therewith; and is more apt to dissolve than the former, even with a moist air; therefore, that made with sea-water by the heat of the sun is more fit for medicinal purposes, and is commonly called Bay Salt. This Salt also, when dissolved and crystallized, is of a cubical form; but that made either with salt springs, or sea-water, by the assistance of fire, cannot be brought into exact cubes, on account of its mixture with other Salts. Bay salt dissolved in water, which being evaporated till a cuticle appears, will shoot to cubical crystals when cold; but that which is left, being of an alkaline nature, cannot be crystallized into any regular figure; however, there is a Salt made therewith, which is now generally known by the name of Epsom Salt. The spirit of Salt, when mixed with an alkaline Salt, as long as they will ferment together, will turn to common Salt, which in its taste, and its cubical shape, resembles Bay Salt; whence it appears, that sea Salt is an acid perfectly saturated with an alkaline Salt. The use of sea Salt is well known for its preventing flesh from putrefaction; and therefore is necessary to hinder the fermentation of victuals, and their corruption; it likewise restrains the heat of the fluids in the body. Besides, when volatile urinous salts are mixed with it, it turns into a Sal-Ammoniac, which is proper to temperate the sharpness of the humours, and to cleanse them by urine. People are in doubt whether it prevents or breeds stones in the kidneys, for many affirm, that the latter is true; but then it must be understood of meats that are rendered hard by being over salted. The spirit of Salt is proper to promote urine, to prevent the stone, to cure the dropsy, and to quench thirst in burning fevers. It is excellent against the scurvy, and is given from three drops to twenty or upwards; or as much as will make any liquor agreeably acid. Dulcified spirit of Salt is given from fifteen to twenty drops every morning, in a decoction of juniper berries.

NATRUM, or NITRUM, of the ancients, is vastly different from the Nitre of the moderns. By old authors, it is said to be an acrid Salt of an alkalious nature, brought from Egypt and other places, which would ferment with acid liquors, and was used for washing of cloaths and for making glass. Natrum is now found in Lesser-Asia, in little hills, like mole-hills, in the spring and summer, of which they make a lye for washing their linen. It is at present seldom seen in Europe, though it was of frequent use with the ancients, not only for medicine, but various other purposes. The natrum of the ancients was a native Salt of a whitish colour and a bitterish taste, which did not crackle in the